

Non-Binary Gender Economics

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July 1, 2024

Abstract

Economics research has largely overlooked non-binary individuals. We provide data on many of their economically-important beliefs and preferences. Non-binary individuals report more gender-based discrimination and less workplace inclusion than men or women. Anti-non-binary sentiment is stronger than anti-LGBT sentiment, and strongest among men. Non-binary respondents report lower assertiveness and confidence. They have different career and life aspirations, valuing career prosociality more and having children less. Their social preferences are similar to men's and less prosocial than women's, with age an important moderator. Stereotypes are inaccurate, as respondents often mistake the direction of group gender differences or exaggerate their size.

Keywords: Gender differences, Non-binary gender, Experiments, Labor

JEL Codes: C90, D10, J10

*We thank Boston University and Harvard University for funding. Emma Ronzetti (data analysis), Nicholas Traver, and Yanting Wang provided research assistance. We thank Billur Aksoy, Donald Cox, and various seminar participants for helpful comments. Pre-registration can be found at: https://aspredicted.org/2QR_7K5.

1 Introduction

A large economics literature has explored gender differences across an array of economically important contexts, particularly in the workplace. Research has revealed significant differences on average between men and women in both fundamental preferences (such as risk-tolerance and altruism), workplace behaviors (such as competitiveness and performing non-promotable tasks), and beliefs (such as self-confidence).¹ These differences have been shown to have explanatory power for gender gaps in educational and professional outcomes (e.g. Buser et al. (2014)).

However, this work has almost exclusively used a binary notion of gender—comparing men and women—leaving us with limited data on gender minority populations.² Best practice in scientific research rejects binary measurement of gender. A National Academies of Sciences, Engineering, and Medicine (2022) report on measuring gender concluded that “standard binary measures of sex are an inadequate proxy for the primary measurement of gender and sex traits”, and psychological research has challenged the scientific basis for a binary view of gender (e.g. Hyde et al. (2019)).³ This suggests a need to not only measure gender in more inclusive ways in economics research, but also to build samples that can provide relevant insights on the beliefs, preferences, and behavior of gender minorities.

The absence of data on gender minorities is meaningful. More than one million individuals in the United States identify as gender non-binary or genderqueer (Wilson and Meyer 2021).⁴ Further, younger individuals are more likely to identify as non-binary, to reject the notion of binary gender, and to hold more nuanced views of gender (Kenney 2020), suggesting both changing norms as well as an increase in the size of the group over time.

One often cited motivation for studying gender differences is the gender wage gap - which has remained relatively stable at women earning about 80 cents on the dollar compared to men over the last 20 years (Aragao 2023). Sparked by this disparity, a wealth of research has sought to unpack the sources of gender gaps not only in earnings but also in representation and advancement, informing potential interventions and management practices. The economic

¹See Niederle (2016) for a recent survey.

²Recent exceptions are discussed in Section 1.1.

³The World Health Organization (2024) provides an explanation of the difference between gender and sex, stating that sex “refers to the different biological and physiological characteristics of females, males and intersex people, such as chromosomes, hormones and reproductive organs,” while gender refers to “the characteristics of women, men, girls and boys that are socially constructed”. Our focus is on gender. Though, note that past work has not always distinguished the two terms clearly, and even the separation of sex and gender as biological versus social has been questioned in more recent work (Muehlenhard and Peterson 2011).

⁴This may be an underestimate as these data come from self-reports, and previous work shows sensitive information is under-reported even in anonymous surveys using best practices (see Coffman et al. (2017) on non-heterosexual identity).

argument for studying gender differences in preferences and beliefs across other gender identities is similarly strong. According to a recent study by the Human Rights Campaign, non-binary workers earn roughly 70 cents on the dollar compared to a typical worker (HRC Foundation 2021). This suggests a need to understand the factors that contribute to this gap.

These patterns motivate our study of non-binary gender differences in economic behavior. We take the approach of surveying individuals about a wide-ranging set of preferences, beliefs, aspirations and experiences. Rather than pursue a deep dive into any one dimension, we aim to provide a look at differences across many dimensions. In doing so, we hope to lay the groundwork for future investigations into many of the differences we uncover. In addition to exploring differences in preferences and beliefs across men, women, and non-binary individuals, we also collect detailed data on *beliefs* about these differences. These beliefs data reveal the stereotypes that individuals hold about non-binary individuals, which may be useful for understanding the extent and nature of belief-based discrimination in the workplace and beyond.

Our work also demonstrates the feasibility of eliciting gender using inclusive response categories. Including non-binary gender as a gender category response marks a shift in practice: in our search, only one paper gathering novel data in a “top five” economics journal in 2023 reported collecting non-binary gender data in either the manuscript or appendix.⁵ Moreover, a search of the EconLit database finds only 7 papers containing terms for non-binary gender in the full text in the last decade.⁶ Other fields have already resolved these as best practices (e.g. American Psychological Association, 2016).

We provide an overview of non-binary gender differences using data from a large ($N = 1,917$) online survey that includes more than 450 non-binary respondents. The data come from the most popular online platform for economics research, Prolific, thus providing insight on the population most commonly studied. Further, while not representative, Prolific provides a heterogeneous sample of adults across many important demographics.

In this sample, we collect detailed information on gender through a series of inclusive questions. We restrict our attention to respondents who provide consistent answers across repeat measures, limiting measurement error in this key variable. We elicit the importance of their gender identity, their feelings of masculinity and femininity, and how they believe others

⁵That paper was Bronchetti et al. (2023). We found 43 total papers in a top five journal that had novel data as their primary dataset. We did not check the dataset of any paper, so non-binary data might have been collected but not reported.

⁶By way of contrast, 1,508 articles appeared for the same search in APA PsychInfo, a database of psychology articles. We searched for (nonbinary AND gender) OR (non-binary AND gender) OR genderfluid OR genderqueer) in the full text between 2013 and 2023.

perceive them on these scales. Next, we measure preferences across various categories: classic economic preferences (risk and time), social preferences (altruism, trust, reciprocity, and deception), and self-confidence and self-assertion. Further, to better understand stereotypes, we measure beliefs of what those preferences look like for each group; e.g. how do you think the non-binary respondents answered the question about trust? Respondents also report life experiences, especially with respect to discrimination, as well as life aspirations, e.g. career, children, pro-sociality, and so on. Finally, we measure sentiment toward non-binary individuals—e.g. would you be comfortable with a non-binary manager at work?—and elicit similar sentiments towards the LGBT population as a benchmark.

Across results, the non-binary population emerges as an independent third group. Sometimes their beliefs and preferences are closer to the average of women’s, in others they are closer to the average of men’s. The patterns underline that gender differences in behavior are not simply a reflection of biology or masculinity and femininity, but also a function of experiences and social context including power dynamics, social norms, and treatment by others (Connell 1987; Lorber et al. 1991; West and Zimmerman 1987).⁷ Understanding how these forces inform the economic beliefs and preferences of non-binary individuals specifically is an important topic for future work; our findings suggest several interesting pathways for investigation.⁸

By design, this project has many results. We outline more details below. Trying to summarize, there are two large sets of results. First, the non-binary population experiences more animosity than men and women. They are more discriminated against, feel more discriminated against, and do not feel nearly as included in the workplace. Second, the non-binary population reports less self-assertion across different measures such as competitiveness, self-confidence, and willingness to negotiate. This is notable, given that these measures have been found to predict the men-women gender gap in economic outcomes.

In more detail:

1. *Gender, masculinity, femininity*: Gender identity is more important to non-binary

⁷A large literature outside of economics wrestles with the origins and implications of gender. These include psychoanalytic theories (Person and Ovesey 1983), biosocial theories (Udry 1994), social cognitive theories (Bussey and Bandura 1999), and sociological theories (including the pioneering work of Connell (1987); Lorber et al. (1991); West and Zimmerman (1987)) that consider gender as a function of human interaction. These theories of gender provide important context for interpreting differences across gender. For instance, Kimmel (2000) argues that it is inequality itself that produces differences in behavior across gender, as opposed to differences in behavior leading to inequalities.

⁸Though our focus is on gender differences, we ran additional versions of our main analyses that explore these gender differences controlling for either sex assigned at birth or continuous measures of masculinity and femininity. Even when controlling for sex assigned at birth or continuous gender identity, the sign and magnitude of differences between non-binary individuals and men and women are generally similar to those reported in the paper. However, the precision of the estimates are lower with these additional controls, likely due to multicollinearity. Results available upon request.

respondents than it is to men and about the same as it is to women. Non-binary respondents typically report non-extreme values of masculinity or femininity, and as a result, fall between men and women on average. Most non-binary respondents use the pronouns “they/them/theirs”.

2. *Anti-non-binary sentiment:* The modal response among men and women, across various professional and social contexts, is zero discomfort with non-binary individuals; however, roughly half report *some* discomfort. As a benchmark, men and women report more discomfort with non-binary individuals across contexts than with LGBT individuals. On average men and women tend to agree with the existence of non-binary gender in humans; however, the distribution is bimodal, with the most common response “strong agreement” (30%) and the second most common response “strong disagreement” (15%). Women generally perceive non-binary individuals more favorably than men do, expressing less discomfort and being more likely to believe non-binary identities exist.
3. *Experienced discrimination:* Non-binary individuals report experiencing more discrimination based on their gender than do men or women across a variety of situations: at school, in medical settings, in public, in court or with police, and online. The exception is at work, where non-binary individuals and women report similar levels of experienced discrimination. In contrast, men and women believe that non-binary individuals are discriminated against about as much as women are.
4. *Life and career aspirations:* Relative to men and women, non-binary individuals are more likely to want to help their community and are less motivated by money. They are less likely to want to work with people. Finally, non-binary individuals are substantially less likely to want to have children than either men or women.
5. *Self-assertion:* Non-binary respondents report lower self-assertion than both men and women. We measure self-assertion as an index of competitiveness, generalized self-efficacy, willingness to negotiate, and the unwillingness to take on non-promotable tasks. In terms of magnitudes, the difference between non-binary individuals and men and women (averaged) is about the same as the difference between women and men. Some of these differences can be explained by the younger age of non-binary respondents. However, even conditional on age, non-binary respondents report significantly less competitiveness than men or women.
6. *Confidence and stereotyping:* Non-binary respondents, like women, under-estimate their performance more in a male-typed domain than in a female-typed domain, while

this pattern is reversed for men. Self-reported masculinity and femininity predict how the self-confidence of respondents varies with the gender stereotype of the domain. Further, individuals stereotype women and non-binary participants as likely to perform better in a female-typed domain and worse in a male-typed domain, exaggerating true differences in performance (Bordalo et al. 2016).

7. *Social preferences*: Women report the highest levels of willingness to give, regard for others, and positive reciprocity, as well as the lowest negative reciprocity, trust, and willingness to lie. In some dimensions, non-binary respondents' reports are, on average, similar to women's, and in other dimensions, they are more similar to men's; age is an important factor in understanding these gaps in social preferences. Respondents hold accurate, though exaggerated beliefs about men-women differences in social preferences; however, beliefs are more inaccurate with respect to non-binary individuals.
8. *Classical economic preferences*: Non-binary individuals report more impatience than either men or women, but are in-between men and women in terms of risk tolerance. These patterns are not well-anticipated by others.

The paper is structured as follows. First, we review related literature on gender minorities. We then describe our survey methodology and the way we measure gender. We give descriptive statistics about the non-binary sample and how they compare to men and women. Then, we turn to the different domains we study. In each of these sub-sections of the paper, we discuss the literature related to the economic attribute we are measuring (e.g. social preferences, self-confidence, etc.), including previous work on differences between men and women. We then explain how we measure the attribute, present our results on observed differences, and compare these results to men's and women's beliefs of differences.

1.1 Related Literature

Nearly all past gender research in economics has focused exclusively on men and women.⁹ There are a few important, recent exceptions that have begun to expand the analysis of gender gaps in economic behaviors beyond binary identities. Brenøe et al. (2022) measure self-reported feelings of “masculinity” or “femininity” among participants, using previous instruments as well as their own novel single-item measure. They show these items predict

⁹Outside of economics, research has shown that non-binary and gender non-conforming individuals are a vulnerable population and may be more likely to be discriminated against (e.g., Davidson (2016); Banan et al. (2023)) and face greater mental health challenges, such as depression and anxiety (Lipson et al. 2019).

classic economic preferences, and do so in the same direction as sex; e.g. being female or reporting higher feelings of femininity both predict less competitiveness. A primary aim of their work is to show that a continuous measure increases statistical power when predicting gender differences in comparison to using binary sex or gender. Relatedly, Fornwagner et al. (2022) use an experiment to tease apart the impact of gender identity versus biological sex in predicting competitiveness, risk preferences, and social preferences. In their sample of cis-gender and transgender participants, they find no consistent role for gender identity or biological sex in predicting behavior. Aksoy et al. (2024) conduct a study of middle and high school students and find that gender diverse students (those who select “other” from male/female/other) are less self-confident about their performance on a math and science test, and that these self-evaluations are predictive of academic performance. They find similar gaps in self-confidence among a gender diverse sample of adults.

Also related to our work is the emergent behavioral economics literature on sexual orientation (Badgett et al. 2021). Buser et al. (2018) and Aksoy and Chadd (2023) study the competitive preferences of gay, lesbian, and straight individuals, finding that gay men compete less than straight men on average and mixed evidence on lesbian versus straight women.

There has also been increasing focus on understanding the treatment and economic outcomes of individuals based upon their gender identity or sexual orientation. Aksoy et al. (forthcoming) show evidence of significant workplace discrimination against transgender individuals in a nationally representative survey of the United States, and Kolk et al. (2023) find that transgender individuals in Sweden fare worse socioeconomically than their cisgender peers. Using a dictator game, Aksoy et al. (2023) document that individuals do not give significantly less to recipients who signal their support for the LGBTQ community; despite this, they observe some anticipated discrimination, with women in particular less likely to signal support when they know it will be observed by the dictator.

Researchers have also looked at responses to the usage of preferred pronouns. Using an audit study, Maupin and McCannon (2023) find that university admissions counselors are more likely to respond and provide friendlier responses to student inquiries that include preferred pronouns. However, these results do not appear to extend to workplace behavior. In another audit study, Eames (2024) finds that employers are approximately 5 percentage points less likely to respond positively to a resume that includes they/them pronouns (relative to a resume that includes he/him or she/her pronouns). Finally, in an email audit study, McCarty (2024) finds they/them pronouns receive fewer responses from academics, with the discrimination treatment effect driven by male recipients.

Our paper expands these recent investigations by analyzing a wide variety of preferences

and beliefs in a diverse, adult sample of men, women, and non-binary individuals. Our focus is specifically on measuring the preferences and beliefs of non-binary individuals, understanding how they compare to men’s and women’s preferences and beliefs, and documenting the perceptions people hold about these gender gaps. Researchers have argued that differences across men and women in domains such as risk-taking, social preferences, self-confidence, and competitiveness are important in understanding gender gaps in educational and workplace outcomes. We extend this large line of research to include individuals with non-binary gender, setting the stage for future investigations that can shed further light on labor market disparities and their sources.

2 Methodology

2.1 Recruitment

Recruiting a large and diverse non-binary sample is a challenge, but we were able to do so using a commonly used online platform, Prolific. Research indicates that participants recruited via this platform provide high data quality (Peer et al. 2017, 2022). Prolific asks its members demographic questions and allows researchers to recruit for studies based on these demographics. Prolific distinguishes between sex and gender, and offers four options for gender: “Man (including Trans Male/Trans Man)”, “Woman (including Trans Female/Trans Woman)”, “Non-binary (would like to give more detail)”, or “Rather Not Say”. At the time of our survey, there were over 1,000 Prolific participants who had selected the non-binary option and were active on the site in the previous two months. Our goal was to collect up to 750 responses for men, women, and non-binary individuals.

Recruitment was done in accordance with our pre-analysis plan: we accepted responses for a month after launch on Nov 15, 2023, up to 750 per gender cell, and raised payment for completion (by \$1) each week.¹⁰ In total, 750 men, 750 women, and 559 non-binary respondents began our survey. We also asked about sex and gender in our survey, both at the beginning and at the end. The primary analysis excludes those who did not complete enough of the survey to get to the second gender question at the end of the survey, those who do not provide internally consistent answers to our gender questions, and those who failed our attention check. Non-binary gender is only slightly more likely to be measured with error with a single response: 0.9% of respondents who initially reported being non-binary reported a different gender identity at the end of the survey, compared to 0.5% of

¹⁰We only screened on being in the USA, being fluent in English, and did not participate in the pilot. Pilot data were collected for a grant application and were never intended for analysis to go into the paper. Available on request.

respondents who initially reported being a man or a woman. Appendix Table A1 shows how the sample restrictions affect sample size at each stage. This leaves us with 721 men, 742 women, and 454 non-binary respondents. These exclusion criteria follow our pre-analysis plan.

2.2 Identifying Gender

We separately measure biological sex (also referred to as sex assigned at birth) and gender, following the recommended practice of experts including Office of the Chief Statistician of the United States (2023) and National Academies of Sciences, Engineering, and Medicine (2022). For biological sex, we ask “What sex were you assigned at birth, on your original birth certificate?”, and response categories include male, female, intersex, and prefer not to answer.

Our gender question asks: “How do you describe your gender?” with 5 response categories: “man or male”, “woman or female”, “non-binary or genderqueer”, “I use a different term (please specify)”, or “Prefer not to answer.”¹¹ This is one of the best practice question formats highlighted by National Academies of Sciences, Engineering, and Medicine (2022) and is the standard developed by the Australian Bureau of Statistics (2021) for their census. To deal with the problem of noise in measuring smaller populations (see Black et al. (2000) on same-sex couples), we included a confirmation question to reduce false positive responses.

We define non-binary individuals as those who do not identify as men or women, and either answer “non-binary or genderqueer” or “I use a different term.” We reviewed the free-text responses of those who use a different term and all were gender related.¹² Throughout, we use responses to the gender (not biological sex) question to categorize people as men, women, or non-binary. This follows our pre-registration plan.

It is worth noting that our focus is on non-binary individuals, as defined above, rather than specifically on transgender individuals. Past work suggests that transgender individuals sometimes identify as non-binary, but may also or instead identify as male or female (Matsuno and Budge (2017) and Liszewski et al. (2018)). Similarly, not all non-binary individuals

¹¹We preferred this framing to a number of other plausible alternatives. For instance, the US Census Pulse survey asks about gender with four options: male, female, transgender, none of these. Non-binary individuals who do not consider themselves trans are grouped into a “none of these” category without further detail. However, listing commonly used terminology for non-binary gender identities likely assists respondents in classifying themselves. Another survey, the CDC’s Survey of Today’s Adolescent Relationships and Transitions (run 2016-2020) lists “Genderqueer/gender nonconforming” as an option. However, the use of the term gender nonconforming is controversial; the term non-binary was recommended as a candidate term for gender identity by the National Academies of Sciences, Engineering, and Medicine (2022).

¹²In contrast, Glassman (2023) notes that previous research examining the “something else” and “none of these” categories used by the Census Pulse have found a high fraction of protest responses or confusion.

identify as transgender (see, for instance, the focus group results in Brown et al. (2022)). However, the relationship between non-binary and transgender depends on the specific definitions used, which still vary across practitioners, clinicians, and researchers (Liszewski et al. (2018), Monro (2019), and Campaign (n.d.)). In the Appendix, Figure A1 illustrates the relationship between the two groups under our working definitions of non-binary and transgender, alongside the relationships suggested by other leading definitions.

Our sample includes 454 non-binary respondents. Nine of those 454 additionally described themselves as transgender in a free-text response about their gender identity. Our method may under-count transgender individuals, as we did not provide transgender as an additional, explicit gender identity outside of man, woman, or non-binary. Of the individuals who identified as men or women in our sample, 35 indicated a different gender identity than their sex assigned at birth.

We can also apply the White House SOGI definition of gender minority to better understand our sample. They define a gender minority as being transgender, or having a gender identity different than sex assigned at birth. Under this definition, 489 participants in our sample are gender minorities, 450 of whom we classify as non-binary under our definition. Of the remaining 39, four indicated they preferred not to answer either or both of our questions on sex and gender identity, one was assigned intersex at birth, and 34 have a “binary” gender identity different than their “binary” sex assigned at birth.

2.3 Analysis

In each section, we begin by presenting our pre-specified analysis. We use the dependent variables outlined in the plan, whether those are individual survey items (e.g. risk preference) or indices (e.g. total business quiz score). When analyzing individuals’ attributes, we use two pre-specified regressions, first predicting outcome with three gender dummies, and second predicting outcome with three gender dummies, age, and race controls.¹³ As noted in the pre-analysis plan, we consider both regressions equally. When analyzing beliefs about attributes, we pre-specified that we would look at beliefs held by men and women together separately from beliefs held by non-binary respondents. In both cases, we only predict beliefs using dummies for the gender of the target (e.g. beliefs about men). Every subsection includes this pre-registered analysis. Note that any additional analysis presented is exploratory and not pre-registered.

¹³Two race categories, “American Indian or Alaska Native” and “Native Hawaiian or Other Pacific Island”, had very little data – $N = 16$, or 0.83% and $N = 4$, or 0.21% – so in the analysis, we pool these with “Other / Two or More Races”. We denote this pooled category as “Other Race” in the regression tables. The results do not meaningfully change if we included these as separate race categories.

We also note that, throughout, we utilize unincentivized survey measures. Incentives generally produce higher quality responses, both by increasing effort, but also by reducing lying via social desirability bias. Social desirability would not affect our results (which are generally all across-gender) if they change responses for all genders equally. However, social desirability could bias our results if non-binary respondents are more or less sensitive to norms than men or women. Our results could also be affected if those willing to identify as “non-binary” in an anonymous, private online survey have different preferences and/or beliefs than the broader population of non-binary individuals.

Further, unincentivized survey measures do not always align with their incentivized counterparts. It is likely beyond the scope of any one paper to explore gender differences using incentivized tasks and games across this many contexts. But, we hope future work attempts to replicate and expand on our findings, stress-testing our results using incentives, different samples, and other methods.

Finally, we note the paradigm for the analysis as it is unique. We are testing for non-binary gender differences across a variety of important contexts. There is no model we are testing, no pre-specified organizing narrative of results. Our goal, rather than providing a bulletproof argument like most papers, is to provide evidence in each context that might be useful to future research, which will provide robustness, models, and so on.¹⁴

3 Who are non-binary people and how do they compare?

3.1 General Demographics

Appendix Table A2 describes the characteristics of our sample, and, where possible, how they compare to the American population (via the US Census Bureau’s American Community Survey, “ACS”). The non-binary sample is younger than those who identify as men or women, which is consistent with previous research (Kenney 2020). Importantly, this suggests that the differences in age across gender that we observe are likely a reflection of population differences, not simply a function of our sampling approach. In terms of race, about three quarters of each gender category identifies as white; the most notable difference is that the non-binary sample is more likely to categorize themselves as other/two or more races and less likely to be black. While a third of the whole sample is married, only 13% of the non-binary sample is; non-binary respondents are much more likely to be single and only slightly more likely to be in a domestic partnership. Economically, the non-binary sample

¹⁴Note that in this paradigm, we do not correct for the many pairwise tests we do. Readers should interpret the results accordingly.

is worse off, with 63% reporting an income less than \$25,000 (compared to 25% of men and 33% of women). This may result in part from a higher unemployment rate in this sample (20% as opposed to about 11% for men and women), and being more likely to be a full-time student (16% compared to 5% for men and women). Relative to the American population, per data pulled from the ACS (see last column of Table A2 in the Appendix), our sample is younger, with this being in part driven by over-sampling the younger non-binary group. As expected when recruiting online for a short, low-paying job, our sample is less likely to be working full time and more likely to be working part time, and is earning less money than an average American. Finally, our sample is also less likely to be from an ethnic minority group compared to American averages.

3.2 Pronouns, Sex, and Sexual Orientation

Non-binary respondents were more likely to have been assigned female at birth than male: Appendix Table A2 shows that 73% of non-binary respondents were assigned female at birth. About 2% of men were assigned female at birth, and about 2% of women were assigned male at birth.¹⁵

Non-binary individuals typically prefer the pronouns “they/them.” We listed a set of 8 different pronouns and asked individuals to check all that apply (they could also supply their own). The large majority of non-binary individuals (89%) selected they/them pronouns. Many were also comfortable using he/him (35% of the non-binary sample) or she/her pronouns (45% of the non-binary sample). Free-text responses (5% offered a response) often indicate openness to any pronouns or combinations of pronouns (e.g. she/they).

We also ask about sexual orientation. Among non-binary participants, 57% say they are either “gay or lesbian” or “bisexual”, while 37% respond they use a different term (frequently queer, pansexual, or asexual). “I do not know” at 2.9% is more common than straight/heterosexual (2.4%). In contrast, 75% of women and 84% of men say they are straight, with only 4% and 1.4% saying they use another term. The higher rate of LGBTQ+ identification among women than among men in this survey is consistent with other research (e.g. Coffman et al. (2017)).

¹⁵To be classified as assigned male or assigned female, we require respondent’s answers to the sex assigned at birth questions at the beginning and end of the survey to match. An additional 1.3% of the sample preferred not to answer one or both of the sex questions, with a higher rate (about 5%) among non-binary individuals. Only 0.5% of the sample gave inconsistent answers to the sex questions.

3.3 Stability of Gender and Degree of Disclosure

In terms of the stability of gender identification, 95% of men and women said they had their current gender identity their entire life. In contrast, only 24% of non-binary respondents say they had their current gender identity their whole life or 10+ years, while 72% either said 1-4 years or 5-9 years. See Appendix Figure A2 for details.

We cannot describe non-binary individuals who are unwilling to disclose their identity to us in an online survey. However, our sample includes many non-binary people who are not open about their identity in many other contexts. We ask non-binary respondents who else knows about their identity. We identify four groups—classmates, coworkers, friends, and family—and ask how many of each group know about the respondent’s gender identity. Respondents answer on a 0 to 5 scale, ranging from “I have not shared it with anyone in this group” to “As far as I’m aware, everyone in this group could know.”

Friends are most likely to know about non-binary individuals’ gender (roughly two-thirds of respondents select “5” for this group), compared to coworkers, classmates, and family ($p < 0.001$ in paired t-test of the 0-5 scale). Distinctions among coworkers, classmates, and family are not statistically significant (differences less than 0.15 on the 0-5 scale). About 34% of non-binary respondents have not shared their identity with their coworkers, and 27% have not shared with their family. Appendix Figure A3 shows more details.

3.4 Gender Importance, Masculinity, and Femininity

Evidence on how important gender is to non-binary individuals helps provide context for this study and guidance about the importance of distinguishing non-binary gender from other genders. We asked respondents about the importance of their gender to their self-image and whether it is an important reflection of who they are (separate 0 – 10 scales, adapted from Lindqvist et al. (2021)).

Gender is more important to non-binary respondents than it is to men, but roughly equally as it is to women. In terms of importance to self-image, women, non-binary, and men report 7.3, 7.3, and 6.5 respectively (non-binary vs men t-test $p < 0.01$; non-binary vs women $p = 0.9$), and in terms of an important reflection of who they are, they report 7.3, 7.1, and 6.4 (non-binary vs men t-test $p < 0.01$; non-binary vs women $p = 0.2$).¹⁶

We were also interested in how gender mapped onto self-assessed masculinity and femininity.

¹⁶Throughout this paper, we use response data from ordered scales (e.g. “Strongly agree, agree...”), following typical approaches in survey research. However, we caution that individuals may vary in their use and cardinalization of these scales (as formalized in Bond and Lang (2019)), complicating interpretation. We leave it to future work to build on our survey evidence using other incentivized measures that may address this challenge.

We asked how respondents see themselves both on a feminine and a masculine scale (separate 0 – 10 scales), adapting questions from Magliozzi et al. (2016) and Brenøe et al. (2022). Moreover, given that dissonance between self-perceptions and the perceptions of others might have implications for well-being or life satisfaction, we also asked individuals how they believed others would see them on these scales.

Non-binary respondents feel both moderately masculine and feminine, with reports falling in between those of men and women. Self-reported masculinity averages are 2.2, 5.0, and 7.8 for women, non-binary, and men respectively (all pairwise t-tests $p < 0.01$). Femininity means are 7.8, 5.2, and 2.2 for women, non-binary, and men (all pairwise t-tests $p < 0.01$). On average, all groups feel as if others’ perceptions are inaccurate, but this is much more pronounced for non-binary respondents. Men and women report absolute differences between others’ perceptions and their own, all between 0.73 and 0.88, and the non-binary group reports almost three times the level of incongruence, 2.34 for femininity and 2.16 for masculinity, with all differences being significant (comparing non-binary to men or women, on masculine or feminine differences, t-test $p < 0.01$).

3.5 Life Aspirations

Gender differences in work-related preferences may account for some of the male-female gender wage gap, but we know much less about how non-binary people compare. Previous research has shown that while women are more likely to favor occupations that are oriented towards working with people, men are more likely to prefer attributes such as money or things, and this can account for some of the gender wage gap (e.g., Fortin (2008); Kuhn and Wolter (2022)).

We adapted questions from The National Longitudinal Study of the High School Class of 1972 (NLS72) that ask about what is important in life and in selecting a career. We ask about the importance (0 to 10 scale) of 4 things: Having lots of money, helping other people in my community, opportunities to work with people rather than things, and having children. The results are shown in Figure 1 and Appendix Table A3.

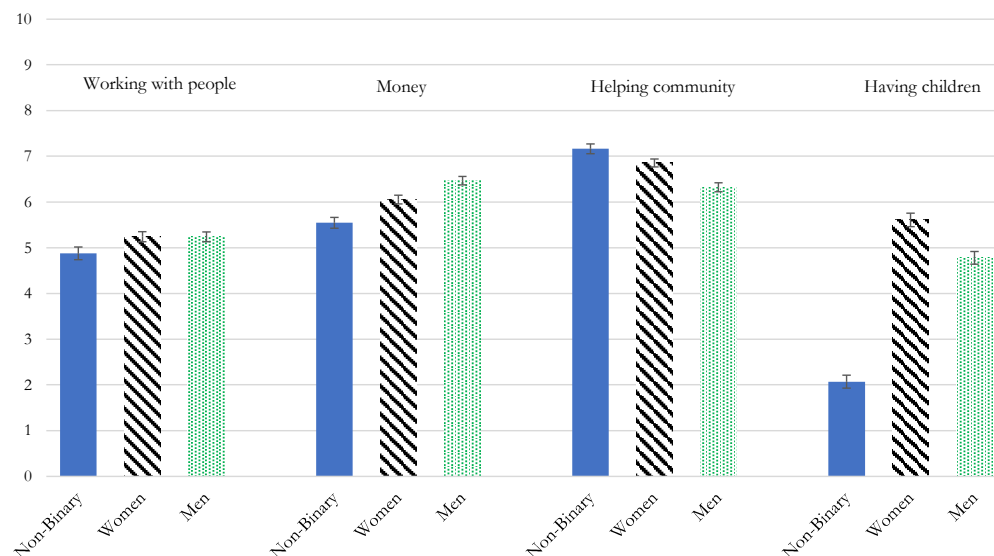
Non-binary individuals are slightly less likely to want to work with people than men or women ($p = 0.04$ versus men, $p = 0.04$ versus women, $p = 0.02$ versus combined men/women). Interestingly, we do not find a significant difference between men and women in this question, though we cannot rule out a difference of plus or minus 0.3 (about 0.10 of a standard deviation) in our 95% confidence intervals.

Non-binary individuals are significantly less likely than men or women to find having a lot of money important, but more likely to find helping others in their community important.

($p < 0.001$ for all gender comparisons here.)

Finally, the largest difference in life aspirations is in terms of desired fertility. Non-binary individuals are much less likely to say having children is important to them. More than half (53%) respond 0 on the 0-10 scale; less than a quarter of either men or women do. The average response of non-binary individuals is 2.7 points lower than men (about 0.7 SD) and 3.5 points lower than women (about 0.9 SD). All pairwise gender comparisons $p < 0.001$. These differences in fertility preferences remain significant when controlling for age (as well as race, per the pre-analysis plan), an important predictor of stated desire for children. The non-binary - men difference decreases to 2.24 points, and the non-binary - women difference is 2.92 points (both $p < 0.001$, see Table A3).

Figure 1: Life Aspirations By Gender



Notes: Respondents answered: “How important is each of the following to you in your life?”, on a scale of 0 = Not at all important; 10 = Very important. Robust standard errors shown.

3.6 Experienced Discrimination and Non-Binary Related-Sentiment

3.6.1 Discrimination: Motivation and design

Measuring discrimination and hostile sentiment towards non-binary individuals is valuable for understanding their experiences. Not only can these experiences be directly harmful, but

they also may affect beliefs about the world and preferences.¹⁷ Thus, these experiences may contribute to other gender differences that we observe, as suggested by the minority stress and minority resilience models (Meyer 2003; Tan et al. 2019; Frost and Meyer 2023; Perrin et al. 2020). Finally, treatment in the workplace and the potential for discrimination can influence occupational choice (e.g. Gutierrez and Rubli (2024)).

We begin by measuring respondents’ degree of comfort with non-binary individuals in a variety of roles. Respondents rated their level of agreement (0-10 scale) with statements about their comfort with non-binary individuals in different settings, such as “I would be uncomfortable if my boss was non-binary.” For comparison, we also later asked parallel questions about LGBT individuals in those same settings, drawing on questions from Coffman et al. (2017) and in line with the approach of Aksoy et al. (forthcoming).¹⁸ These results likely represent a lower bound of discomfort with the non-binary population, as Coffman et al. (2017) show that anti-LGBT sentiment is understated when asked about directly.

We also measured beliefs about the existence of non-binary gender. Existing research on non-affirmation or rejection of dimensions of an individual’s identity— including race, gender, and sexual orientation— terms this “identity denial” and notes that it may be experienced as a microaggression and have negative mental health consequences (Cheryan and Monin 2005; McLemore 2015; Parr and Howe 2019; Maimon et al. 2021; Morgenroth et al. 2024).

We measured experienced discrimination based on gender or gender identity in various settings, using survey questions adapted from previous research studying racial, gender, and sexual orientation discrimination (Williams et al. 1997; Krieger et al. 2005). Specifically, we asked “Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following situations because of your gender / gender identity?” Situations included at school, at work/applying for a job, getting medical care, from the police/courts, in a public setting, or online. We specified in our pre-analysis plan that we would combine responses across domains into a single index.

Experienced discrimination is a subjective measure of whether an individual *perceives* discrimination, here specifically linked to their gender. Subjective experiences are important for understanding beliefs and motivations and also are informative about the prevalence of

¹⁷For instance, there are many studies of how past adverse events might affect future beliefs and behaviors, such as Malmendier and Nagel (2011) on macroeconomic shocks, Hanaoka et al. (2018) on natural disasters, Ang (2021) on police violence, and Bordalo et al. (2024) on health risk and COVID.

¹⁸Note that LGBT, the commonly-used acronym that we employ, includes transgender individuals in addition to lesbian, gay, and bisexual individuals. To the extent that respondents view transgender and non-binary as overlapping, this may create perceived intersection between the groups we ask about across these two questions. We interpret any differences across these attitudinal measures as speaking to how views about non-binary individuals, specifically, compare to views about the broader LGBT population, inclusive of sexual minorities and transgender individuals.

discrimination. Some types of experienced discrimination readily correspond to discrimination as characterized by a third-party observer, such as violence or verbal harassment accompanied by statements about gender. In other cases, subjective experiences may over- or underestimate “true” discrimination: individuals may perceive discrimination in cases where a well-informed third-party observer would not classify discrimination as occurring, or individuals may not be aware that they have been discriminated against.¹⁹ But, while imperfect, this measure is valuable for assessing the extent to which discrimination is perceived to be a problem by individuals themselves and the venues in which it occurs.

Separate from experienced discrimination, we also measured feelings of inclusion, belonging, and being valued at work using the Gartner Inclusion Index (Romansky et al. 2021). Participants answer the extent to which they agree with general statements such as “I feel welcome to express my true feelings at work” and “Employees at my organization respect and value each other’s opinions.”²⁰ Gender differences in feelings of workplace inclusion may stem from a variety of sources, including differences in occupational choices, human capital investment, as well as differential treatment at the point of hire or within a workplace. There are 7 statements in the index, each measuring agreement on a 0-10 scale.

3.6.2 Discrimination and related sentiment: Non-binary gender differences

On average, people disagree with the statement that they would be uncomfortable with non-binary or LGBT individuals. Figure 2 shows the degree of discomfort with both non-binary individuals and LGBT individuals in various roles, with responses broken out by gender. The modal individual strongly disagrees they would be uncomfortable: 50-70% of men and women strongly disagree (answering 0 or 1), depending on the question and gender subgroup. A small fraction 5%-10% strongly agree (answering 9 or 10). See Appendix Figures A4, A5 and A6 for details.

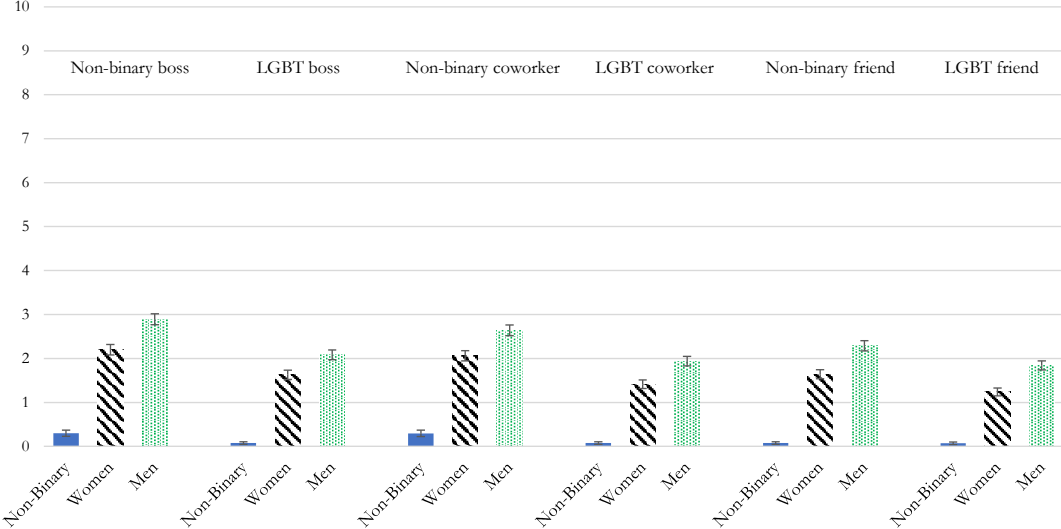
Men report more discomfort with non-binary and LGBT individuals than women do (t-test rejects test of equality between men and women in their discomfort with non-binary individuals in each category with $p < 0.01$ in each category.) To the extent that this expressed discomfort affects non-binary individuals, non-binary individuals may, on average, experience a more supportive environment among women.

¹⁹For instance, a candidate may incorrectly interpret a rejected job application as resulting from discrimination, or alternatively, an unsuccessful applicant may not realize that not getting a job indeed resulted from discrimination.

²⁰The other five statements included in the index are: Employees at my organization who help the organization achieve its strategic objectives are rewarded and recognized fairly. Members of my team fairly consider ideas and suggestions offered by other team members. Communication we receive from the organization is honest and open. People in my organization care about me. Managers at my organization are as diverse as the broader workforce.

There is more discomfort among men and women with non-binary individuals than with LGBT individuals. We reject equal discomfort between non-binary individuals and LGBT individuals in each situation (unpaired t-test pooling men and women, comparing a non-binary versus LGBT individual in a situation, $p < 0.001$ for each comparison; test not pre-specified.)

Figure 2: Degree of Discomfort with Non-Binary and LGBT Individuals

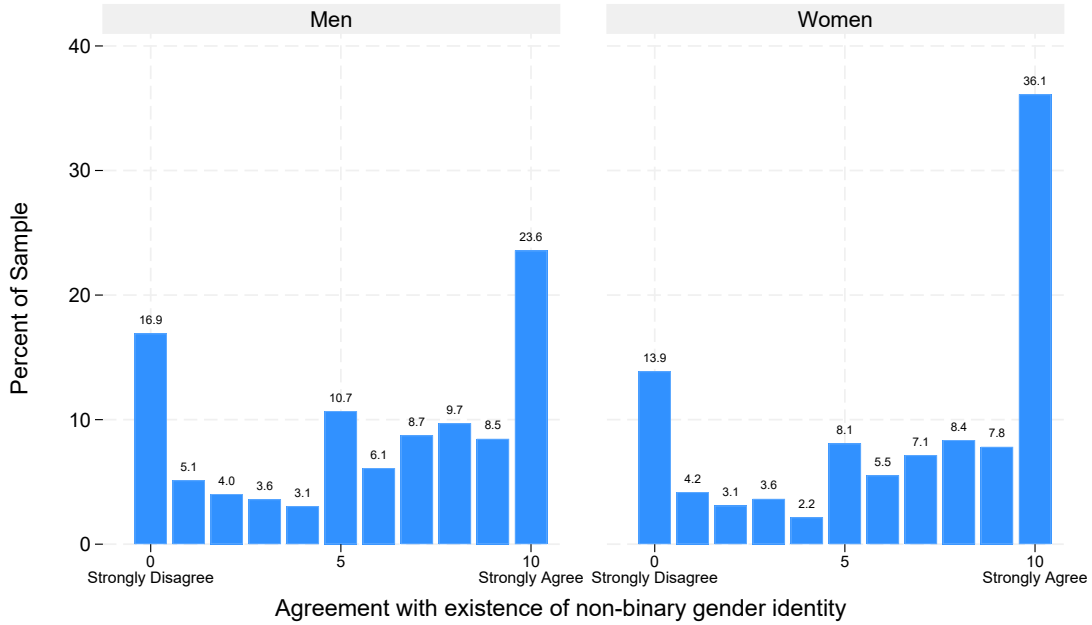


Notes: Respondents rated their level of agreement (0 = Strongly disagree; 10 = Strongly agree) with a set of statements: “I would be uncomfortable if my boss was non-binary”, “I would feel uncomfortable working closely with a non-binary person in my workplace”, “If someone I knew revealed to me that they were non-binary, I would probably no longer be as close to that person.” Respondents then responded to the same set of questions, with non-binary replaced with “Lesbian, Gay, Bisexual, and/or Transgender”. Robust standard errors shown throughout.

For believing in the existence of non-binary gender, the mean level of agreement among men and women (about 6 on a 0-10 scale) masks significant heterogeneity: the distribution is bimodal. Figure 3 shows that, among both men and women, the modal response is strong agreement (10), but that strong disagreement (0) is the second most common response. On average, women are more likely than men to agree non-binary gender exists (difference = 0.75, $t=-3.8$, $p < 0.001$). Unsurprisingly, non-binary respondents believe their identity exists (an average level of agreement of 9.7 on a 10 point scale).

Figure 4 shows that non-binary individuals report higher experienced discrimination based on their gender than men or women across each context ($p < 0.001$), except in the context of work and hiring, where women and non-binary respondents report similar levels

Figure 3: Acknowledgment of the Existence of Non-Binary Gender Identity



Notes: Respondents rated their level of agreement (0 = Strongly disagree; 10 = Strongly agree) with this statement: “Although much of humanity is male or female, there are also identities in between.”

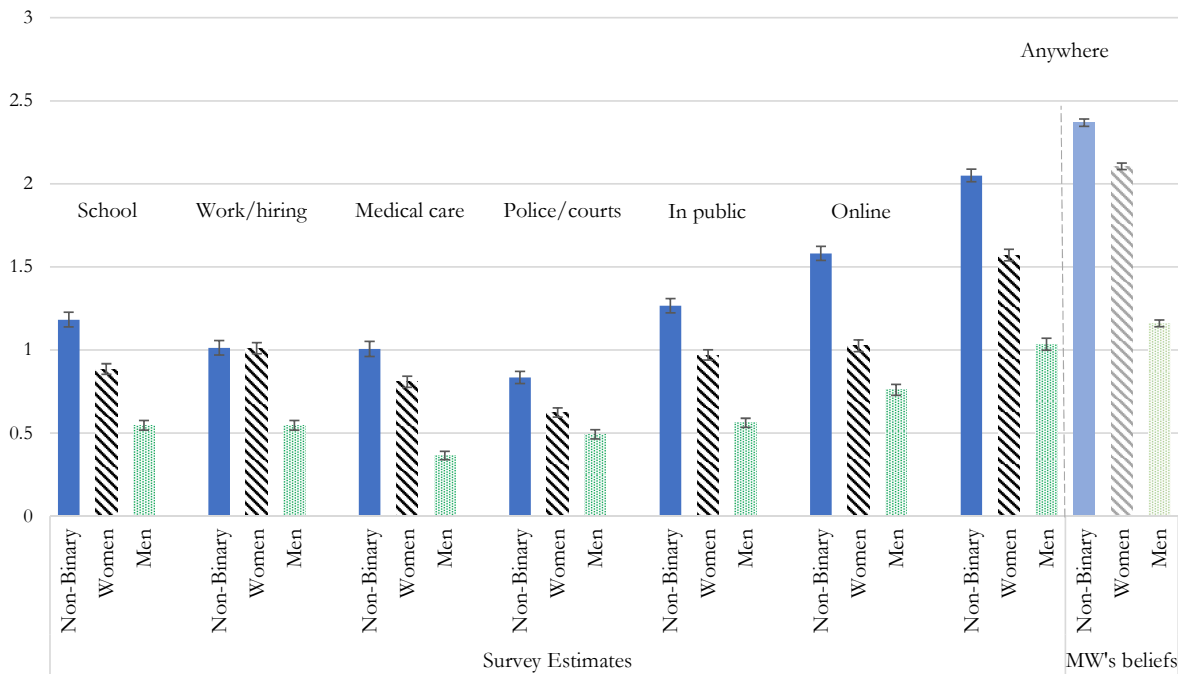
of experienced discrimination (average response for both groups = 1.01, $p = 0.96$). Table A4 in the Appendix shows regression estimates, and including pre-registered controls does not change this pattern. To interpret the level of the response, about 35 percent of non-binary individuals report never experiencing discrimination at work, while about 60 percent of men do. (Appendix Figures A7, A8, and A9 show the distribution of responses by gender.) Online, 57 percent of non-binary respondents report experiencing discrimination sometimes or frequently, compared to 31 percent of women and 20 percent of men. Per the pre-registration, we also create a discrimination index, averaging across categories within each respondent.²¹ The average experienced discrimination is highest for non-binary individuals (1.1), followed by women (0.9), followed by men (0.5), with all pairwise differences between genders significant with $p < 0.001$. We can also compare whether a group has experienced discrimination in any of the contexts by taking the maximum across categories within each respondent. The bars for “Anywhere” in Figure 4 show, again, non-binary respondents report the highest rates of experienced discrimination, at 2.05, significantly higher than women, at 1.57, and men, at 1.03 (both comparisons significant at $p < 0.001$).²² With a standard

²¹The pre-registration calls for a sum, which is the same as an average for statistical comparisons’ sake. We use the average to put the index on the same scale as other measures.

²²Note this variable is not pre-registered.

deviation of 1.01, the non-binary group is 1.01 s.d. above men, and 0.48 s.d. above women in experiencing any discrimination across contexts.²³

Figure 4: Discrimination



Notes: Reports average responses for experienced discrimination, “Survey Estimates” (on the left, in opaque bars). Beliefs held by men and women of how much each gender faced discrimination, on average, is shown as “M’s/W’s beliefs” (rightmost group, in more transparent bars). Question asked was, “Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following situations because of your gender / gender identity?” with answers on a 0 “Never” to 3 “Frequently” scale. “Anywhere” reports the maximum of the six contexts. Perceived discrimination question was “How often do you feel that each of the following groups is discriminated against?”

The Gartner Inclusion Index is a sum of seven statements, all coded so that higher values signify more inclusion. Each item is on a 0-10 scale, so the simple-sum index runs from 0 to 70. All regressions are reported in Appendix Table A6. Consistent with other measures in this subsection, non-binary participants report a much more negative work and life experience than men or women. The overall mean in our sample is 41.9 (with a s.d. of

²³One could also consider how experiencing discrimination correlates with the other preferences and beliefs we measure. We find the strongest relationship between measured discrimination and social preferences: greater experienced discrimination correlates with less trust in others, less positive reciprocity, greater negative reciprocity, and greater stated willingness to deceive others. We find no relationship between our discrimination index and our self-assertion index. Moreover, past discrimination seems to have at most weak explanatory power for differences across gender in any of these dimensions. Results available upon request.

16.7), suggesting moderate feelings of inclusion (i.e. an average of 6.0 out of 10 for each individual item). Men report the highest average inclusion at 44.8. Women are 1.9 points lower than men ($p = 0.02$). Non-binary feelings of inclusion are meaningfully lower than either group: The non-binary mean is 9.1 points lower than men and 7.1 points lower than women ($p < 0.001$ for either, in a simple t-test or regression with age and race controls). The difference between non-binary individuals and others is only slightly attenuated when controlling for age and race. Using a simple sum is nice in its simplicity and transparency, but it could overweight an item that has more variance, and so on. Reassuringly, all results hold when using an index that is a sum of z-scores for each item, which was also included in the pre-analysis plan (Also included in Appendix Table A6).

3.6.3 Beliefs about discrimination

Respondents were also asked about their beliefs about the discrimination experienced by different groups. Consistent with self-reported experiences, men and women believe non-binary individuals experience more discrimination than women and substantially more than men ($p < 0.001$ for both comparisons; see the three rightmost bars in Figure 4).²⁴ (Table A5 in the Appendix also shows regression estimates of beliefs.)

4 Motivation, design, and results, by topic

The remainder of the survey asks participants about a range of economically-relevant beliefs, preferences, and experiences. We rely on simple, previously-validated survey measures when possible. This enables us to cover a breadth of topics. In addition, we ask all participants to provide their beliefs of how others answered these same questions. We ask for their beliefs of the average response to each question for men, women, and non-binary respondents. In the sub-sections that follow, we explain the design and related literature on the topic, present data on non-binary gender differences in responses, and then explore participant beliefs about gender differences. In this way, we shed light not only on differences across gender, but also on the relevant stereotypes and mis-perceptions that others hold. We choose to focus on the beliefs held by men and women, as this sub-sample provides a more representative view of the externally relevant population compared to our sample that includes disproportionately more non-binary respondents. Data on beliefs from all participants, including non-binary respondents, can be found in the Appendix.

²⁴Note we only asked beliefs of experienced discrimination overall, not by context, and not about discrimination specifically due to gender.

To facilitate reading, we organize this section by topic: Each subsection will provide motivation, design, and results for that topic (i.e. classic economic preferences, social preferences, etc.). The results will begin by assessing differences between the non-binary respondents and men and/or women, and proceed to measure beliefs of what those differences might be, both by the non-binary respondents and men and women pooled. Unless otherwise stated, all tests follow the pre-analysis plan. According to the pre-analysis plan, tests are conducted between genders, first unadjusted for any covariates, then adjusted for age and race.²⁵ In both cases, we test the gender coefficients in an OLS regression with robust standard errors.

4.1 Self-Assertion

4.1.1 Self-Assertion: Motivation and design

This section examines preferences, beliefs, and behaviors broadly related to self-assertion. We explore competitiveness, self-efficacy, willingness to negotiate, and (un)willingness to take on non-promotable tasks, and group these under the umbrella term “self-assertion.” In each of these dimensions, there is robust evidence of gender gaps between men and women, but very limited evidence on how non-binary individuals compare. On the one hand, non-binary individuals are intermediate between men and women on scales of masculinity and femininity, and so might be expected to be intermediate on these behaviors to the extent they are stereotypically masculine. On the other hand, it is not clear how the norms, stereotypes, and social expectations that influence these behaviors apply to non-binary individuals. To the extent that status and power dynamics shape gender gaps, we might expect non-binary individuals, who experience more extreme negative sentiment and vulnerability, to express more extreme preferences and beliefs in this domain.

Competitiveness: Niederle and Vesterlund (2007)’s paper documenting gender differences in willingness to compete jump-started a large behavioral literature on gender differences across an array of self-assertion related-behaviors. They find that, even conditional on

²⁵There are different perspectives on how to measure gender differences. One perspective looks at the total average difference between genders in a representative sample of the population. This method captures the entire gender difference in the population on the attribute that is being studied, regardless of the source. A second perspective examines gender differences, holding fixed other relevant attributes, such as income and education. This method is used implicitly in studies that examine, for instance, gender differences in laboratory experiments recruiting from university students (which conditions on attending a university, despite gender differences in university attendance rates). It is also used when studies regression-adjust gender differences. In our sample, we pre-specified controlling for age and race, as it was known that non-binary individuals were younger on average, and other evidence suggested racial differences in identification as transgender (related but distinct). These two variables are also arguably exogenous, especially relative to our other covariates such as income or education.

talent and confidence, men are more willing to opt into competitive tournaments than women.²⁶ Follow-up work has begun to establish links between these laboratory measures of competitiveness and labor market outcomes. For instance, Reuben et al. (2017) find that competitiveness helps to explain the gender gap in earnings expectations, and Kamas and Preston (2018) and Reuben et al. (2015) link competitiveness to realized compensation, helping to explain gender gaps in earnings. Competitiveness has also been linked to educational choices, with more competitive individuals choosing more prestigious, demanding educational tracks (Buser et al. (2014)).

We rely on a simple, previously validated survey measure to elicit the competitiveness of our participants. As in Buser et al. (2021), we ask, “How competitive do you consider yourself to be?,” with participants responding on a 0 (not at all competitive) to 10 (very competitive) scale. Fallucchi et al. (2020) and Buser et al. (2021) have validated this type of survey measure of competitiveness, showing that it predicts behavior in incentive-compatible experiments, as well as earnings and occupation choices.

Self-Efficacy: Generalized self-efficacy captures a sense of an individual’s perceived agency (Schwarzer and Jerusalem 1995). This measure is closely related to confidence and self-esteem and is likely related to a variety of self-assertion behaviors in the workplace. Indeed, interventions that improve self-efficacy have been found to lead women to advocate for their preferred level of labor supply (McKelway 2021). Following Schwarzer and Jerusalem (1995), we measure generalized self-efficacy by asking, “Can you solve most problems if you invest the necessary effort?” Participants respond on a 0 - 10 scale, with 0 indicating “No, I cannot” and 10 indicating “Yes, I can.”

Negotiation: Past work reveals that women are less likely to initiate negotiations than men (e.g., Babcock and Laschever (2003)). These differences are typically largest in distributive, rather than integrative, negotiations and when there is more ambiguity around acceptable outcomes (Bowles et al. 2022). We measure willingness to negotiate by asking participants, “Generally, are you someone who is willing or unwilling to initiate a negotiation?,” with participants responding on a 0 (very unwilling) to 10 (very willing) scale.

Non-Promotable Tasks Our last measure in this domain probes willingness to take on non-promotable tasks. In recent work, Babcock et al. (2017) show that women are

²⁶Relatedly, Gneezy et al. (2003) find that mixed-sex competition improves men’s performance, but not women’s. These gaps have primarily been identified in more male-typed tasks, with evidence of reversals when more female-typed tasks are used (Dreber et al. 2011; Shurchkov 2012; Boschini et al. 2019). Some scholars have suggested that risk preferences and self-confidence play a large role in explaining these gender differences (Gillen et al. (2019) and Van Veldhuizen (2022)). See Niederle (2016) and Shurchkov and Eckel (2018) for more detailed overviews.

more likely than men to agree to do tasks with low-promotion potential, i.e., tasks that are individually costly but valuable to the team or organization. They also find that women are more likely to be asked to do these tasks. These differences are not explained by altruism or risk preferences. More recent work has found evidence for these same patterns in the field. For instance, Chu et al. (2022) show that women are more likely to engage in the non-promotable task of clinical note taking in medical settings.

We ask participants, “How likely are you to be the one to do a thankless, but necessary, task in a group?,” and participants respond on a 0 (very unlikely) to 10 (very likely) scale. Note that this measure gets at both their willingness to take on a non-promotable task, while also embedding potential differences in the likelihood of being asked.

Following our pre-registration, we also construct an index that consists of the sum of competitiveness, generalized self-efficacy, willingness to negotiate, and the inverse of willingness to take on non-promotable tasks. Below, to harmonize scales across the index and other measures, we will report the average self-assertion report (i.e. one-fourth of the index), which is simply a re-scaling of our pre-registered measure.

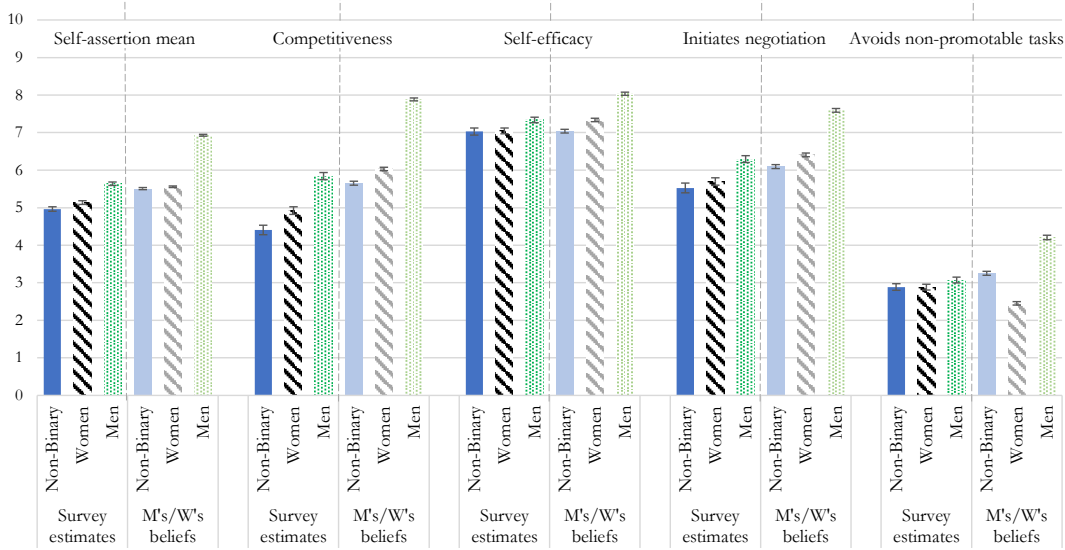
4.1.2 Self-Assertion Results: Non-binary gender differences

There are significant differences in these self-assertion related preferences and beliefs between genders. Beginning with our index measure, we replicate past evidence that has found men to self-assert more than women. As can be seen in the three leftmost bars in Figure 5, the average index score for men is 5.64, but only 5.14 for women ($p < 0.001$). On average, non-binary respondents score lower on this index than both men and women, with an average score of 4.96 ($p < 0.05$ compared to women, $p < 0.001$ compared to men). This corresponds to non-binary individuals scoring 0.51 standard deviations (SDs) less than men and 0.13 SDs less than women. Appendix Table A7 shows regression estimates, with and without pre-registered controls. When controls are added, non-binary participants continue to score lower than women on the index of self-assertion, but this difference is about half the size as without controls and not statistically significant. Controlling for age, as the non-binary group is much younger, explains much of this attenuation.

Zooming in on the individual measures that make up this index, we see a somewhat similar pattern across the four components, with non-binary individuals scoring significantly lower relative to men (except in avoiding non-promotable tasks, with a $p = 0.11$). Differences between non-binary individuals and women are smaller and not statistically significant, with the exception that women report higher competitiveness.²⁷ Non-binary individuals report an

²⁷Adding the pre-specified age and race controls alter the male-non-binary comparisons only slightly: For self-efficacy, the estimated gap decreases and the p-value increases to 0.15, and for avoiding non-promotable

Figure 5: Self-Assertion



Notes: Reports average responses for each self-assertion measure as well as the average response to all four individual items, i.e. the “self-assertion mean” (equivalent to one-fourth of the “self-assertion index” to put all bars on a 0 to 10 scale). “Survey estimates” (on the left in each grouping, in the opaque bars) are subjects’ reports for themselves. “M’s/W’s beliefs” (on the right in each grouping, in the more transparent bars) report beliefs of men and women of how each gender responded on average. “Competitiveness”: How competitive do you consider yourself to be? “Self-efficacy”: Can you solve most problems if you invest the necessary effort? “Negotiation”: Generally, are you someone who is willing or unwilling to initiate a negotiation? “Non-promotable tasks”: How likely are you to be the one to do a thankless, but necessary, task in a group? All on 0-10 scale, with “non-promotable” score flipped here to show avoidance. Robust standard errors shown throughout.

average competitiveness of 4.4 on the 0-10 scale, more than half a standard deviation lower than men and approximately one-fifth of a standard deviation lower than women ($p < 0.01$ for all pair-wise comparisons; See “Competitiveness” bars in Figure 5). This difference persists when we include controls (Appendix Table A7). The results for willingness to negotiate are similar. Non-binary respondents report an average willingness of 5.5, which is significantly less than men (by 0.3 SDs, $p < .001$) and similar to women’s (less by 0.07 SDs, $p = 0.27$; See “Negotiation” bars in Figure 5).

tasks, the estimated gap increases, and the p-value decreases to 0.02. The other men-non-binary comparisons are qualitatively similar. The women-non-binary comparisons are less robust. Adding controls often affects both the sign and significance of the test (with the exception of competitiveness, where women’s self-reports are significantly greater regardless of specification). See Table A7 for details.

Differences in generalized self-efficacy and willingness to take on non-promotable tasks are smaller. Non-binary individuals report an average of 7.0 on the generalized self-efficacy scale, on par with women’s average score but 0.15 SDs less than men’s ($p < 0.01$ for comparisons of men to either non-binary individuals or women; $p = 0.88$ for women v. non-binary individuals; See “Self-Efficacy” bars in Figure 5). Non-binary individuals report a high willingness to take on non-promotable tasks, averaging 7.1 on the scale. This is similar to women’s indicated willingness (also averaging 7.1), and men’s (non-binary greater by 0.10 SDs, $p = 0.12$; See “Non-promotable task” bars in Figure 5). With controls, the difference between non-binary individuals and men becomes significant at $p < 0.05$; see Appendix Table A7).

Overall, we find economically and statistically meaningful differences in preferences and beliefs related to self-assertiveness and confidence across gender. Consistent with past literature, we find that men’s self-assertion, broadly defined, significantly exceeds women’s, particularly in terms of competitiveness and willingness to negotiate. When we expand consideration to non-binary individuals, we find that their self-assertion does not lie between men’s and women’s. Instead, non-binary respondents report self-assertion similar to or less than women’s. In terms of magnitudes, it is worth noting that the estimated gap between men and women in our z-scored self-assertion index is 0.38 SDs. The gap between non-binary individuals and others (pooling men and women) is nearly as large, at 0.31 SDs. This suggests a need to explore how differences in self-assertion, particularly in terms of competitiveness and willingness to negotiate, may contribute to disparities in economic opportunity across different gender identities.

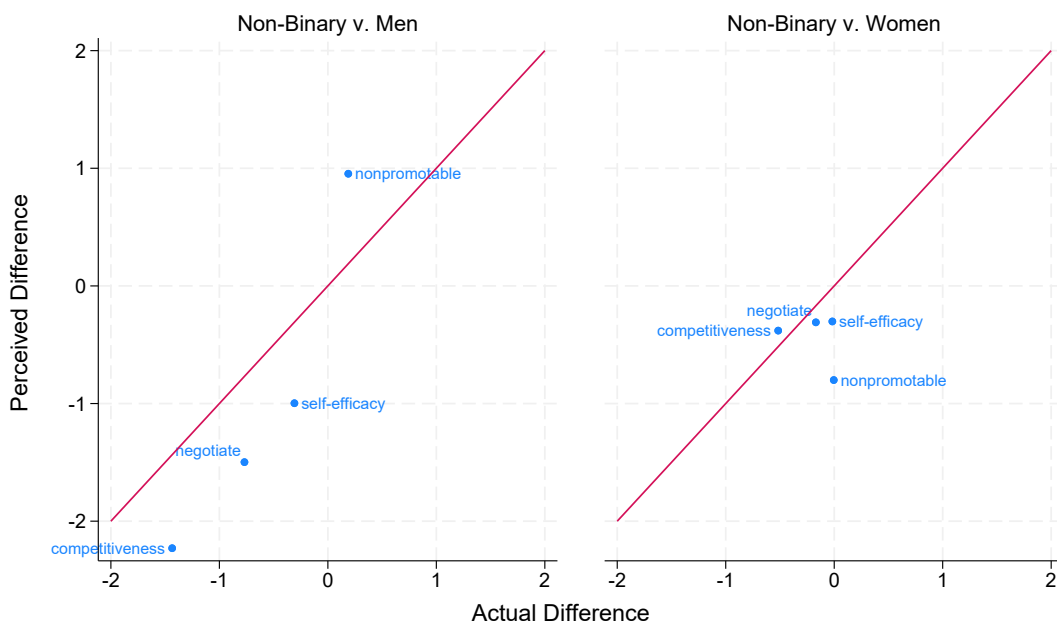
4.1.3 Beliefs about self-assertion

We ask participants for their beliefs about others’ level of competitiveness, generalized self-efficacy, willingness to negotiate, and willingness to take on non-promotable tasks. The transparent bars in each grouping in Figure 5 show the average beliefs held by men and women when asked about each gender (Also see Table A8 in the Appendix for all regression estimates of self-assertion beliefs including with pre-registered controls). Further, Figure 6 plots actual versus perceived gender differences in these measures. Overall, our sample overestimates the differences between men and women, while under-appreciating the differences between non-binary individuals and others. We start by considering an index of beliefs of self-assertion, summing across beliefs of our four measures and then standardizing. We find that individuals believe that women’s self-assertion behavior is 1.20 SDs lower than men’s ($p < 0.001$), three times the size of the true observed difference in our sample. This follows previous literature that has typically found beliefs that exaggerate true differences, in line

with theories of stereotyping (Bordalo et al. 2016, 2019).

Participants correctly anticipate that self-assertion is lower for non-binary individuals than women, but they under-estimate the magnitude of the gap. On average, individuals anticipate a 0.04 SD gap between women and non-binary individuals ($p < 0.01$), approximately one-third the size of the observed gap in our sample. The beliefs of non-binary individuals are no more accurate than the beliefs of men and women. Indeed, they estimate the largest gap between men and women (1.4 SDs) and still under-estimate the gap between women and non-binary individuals (0.05 SDs).

Figure 6: Actual and Perceived Gender Differences in Self-Assertion



Notes: Compares non-binary individuals with men (left) and women (right) on each self-assertion measure (0 to 10 scale). The x-axis presents the actual difference between non-binary individuals and the other gender, while the y-axis is the perceived difference (measured among men and women). 45 degree line is also plotted.

Interestingly, the index masks significant variation across measures. In fact, in terms of competitiveness, generalized self-efficacy, and willingness to negotiate, respondents anticipate that men have significantly greater self-assertion than women, who in turn have significantly greater self-assertion than non-binary individuals. On each of these three measures, beliefs exaggerate true differences for each of the pairwise comparisons (men v women, men v non-binary, women v. non-binary). The outlier is our measure of willingness to take on non-promotable tasks. Here, participants believe that men are significantly less likely to take on non-promotable tasks than women (by 0.94 SDs, $p < 0.001$), but they believe that

non-binary individuals' willingness falls between men's and women's (0.57 SDs greater than men's, $p < 0.001$).

Figure 6 summarizes the evidence on actual versus perceived differences in self-assertion. The x-axis plots the observed average difference (between non-binary individuals and men in the first panel and between non-binary individuals and women in the second panel), while the y-axis plots the average believed difference. We see that our sample consistently overestimates the extent to which men's self-assertion behaviors exceed non-binary individuals'. The second panel illustrates that beliefs are more accurate when it comes to differences between non-binary individuals and women. With the exception of willingness to take on non-promotable tasks - where our sample incorrectly anticipates that non-binary individuals will be less willing to take on non-promotable tasks than women - believed differences are roughly in line with observed differences.

4.2 Self-Confidence and Stereotypes

4.2.1 Motivation and design

Male/female gender differences in self-confidence have been well documented (Beyer and Bowden 1997; Barber and Odean 2001; Jakobsson 2012; Coffman 2014); in male-typed tasks, women hold more pessimistic beliefs of their own past performance and choose to describe their past performances less favorably in subjective terms (Exley and Kessler 2022). There is also evidence that women update their beliefs more conservatively after receiving positive feedback in male-typed tasks (Coffman et al. 2023).

We elicit measures of self-confidence across different domains, allowing us to understand how beliefs of performance depend upon the stereotype of the domain. We use a simplified version of the paradigm used by Coffman (2014). Participants complete brief quizzes in (i) Business and (ii) Art and Literature. Previous work has found that Business is typically perceived as a more male-typed domain than Art and Literature, including by Prolific participants (Coffman et al. 2023). Each quiz has 14 multiple-choice questions. A participant's score is the number of questions they answer correctly in two minutes. Following the quizzes, participants are asked to guess their exact score in each quiz. In addition, they are asked how they think their quiz performance compared to those of other Prolific participants, with five options ranging from "Far Below Average" to "Far Above Average."

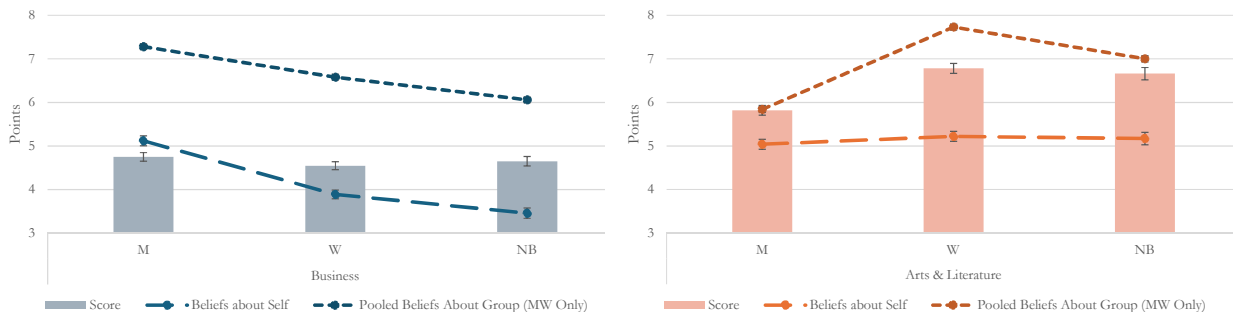
4.2.2 Results

Data on performance beliefs in the domains of business and art shows how self-confidence varies with the stereotype of the domain. Performance is similar across gender on the business

quiz, but men perform worse on the arts quiz than women and non-binary individuals.²⁸ Past literature predicts that beliefs about own and others’ performance will be shaped by stereotypes, with individuals being more optimistic about their performance in more stereotype-congruent domains.

Figure 7 reports performance (in the bars) as well as beliefs about performance (dashed lines), split by gender. The long-dashed lines indicate the average beliefs about one’s own performance in each domain, while the short-dashed lines show men and women’s perceptions of each gender’s performance. We observe that non-binary individuals significantly underestimate their own performance in business, more so than women and much more so than men (who over-estimate their business performance on average). Men, women, and non-binary individuals all under-estimate their performance in art, with non-binary individuals’ under-estimating performance about the same as women and much more than men. Differences in difficulty across the quizzes, with average higher performance in art than business, may confound the role of gender stereotypes in shaping beliefs. To address this, we can use regression analysis that more directly accounts for differences in performance across domains.

Figure 7: Beliefs of absolute performance across gender stereotypes



Notes: Bars represent performance on quizzes. Points on short-dashed line represent beliefs of men and women pooled about each group’s quiz performance. Points on long-dashed line represent each group’s beliefs of own performance. Business quiz in left panel, Art & Literature in right. Standard errors shown throughout.

Table 1 show regressions of beliefs about own performance as a function of domain. In all specifications we include score fixed effects to control for own performance flexibly. Columns 1 and 2 include an indicator for the domain type (Business, as compared to Arts), indicators

²⁸We observe modest, statistically insignificant gender gaps in performance on the business quiz. As shown in the bars in the left panel of Figure 7, men answer an average of 4.75 questions correctly, women answer an average of 4.55 questions correctly, and non-binary individuals answer an average of 4.65 questions correctly ($p > 0.05$ for all pairwise comparisons). Differences are larger on the art quiz (right panel bars, Figure 7), with men answering 5.82 questions correctly, women answering 6.78 questions correctly, and non-binary individuals answering 6.66 questions correctly ($p < 0.001$ for men compared to women and men compared to non-binary, n.s. women versus non-binary).

for gender, and interactions between domain-type and gender. Given that past work has shown that Business (Arts) is perceived as more stereotype-congruent for men (women), we predict that the men-women gap in self-confidence should be larger in Business than in Arts. Indeed, this is what we observe: for both absolute performance (Column 1) and relative performance (Column 2), the coefficient on the interaction between women and business domain is significantly negative. Conditional on performance, compared to men, women predict they do worse on arts and literature quiz (from the coefficient on women) and even worse on the business quiz (from the coefficient on women x business).

Under-confidence among non-binary respondents also varies across domains, despite it being less clear whether or how these stereotypes apply. The gender gap in under-confidence between non-binary individuals' and men is significantly larger in Business than in Arts (coefficient non-binary x business). Non-binary individuals are somewhat more confident than women in Arts (significantly so in terms of believed rank), but somewhat less confident than them in business (significantly so in terms of believed absolute performance). The difference between under-confidence in the arts domain and the business domain is more extreme for non-binary individuals than women (F-test of the two interaction coefficients rejects equality with $p < 0.001$).

One challenge with interpreting this analysis is that we lack data on the stereotype congruence of these domains for non-binary individuals. In our next analysis, we attempt to address this by proxying for stereotype congruence with an individual's self-perceptions. We use individuals' self-reported masculinity and femininity scores as our measure of stereotype congruence in each domain, rather than their gender identity category. Self-reported masculinity in z-score units proxies for the stereotype congruence of business, given that business carries a masculine stereotype; similarly, self-reported femininity in z-score units proxies for the stereotype congruence of arts.

In Table 1 columns 3 and 4, we predict beliefs about own performance from our gender indicators and a single variable for the stereotype congruence of the domain from which the observation is drawn (this is an individual's self-perceived masculinity for business, or femininity for arts). The coefficients on the gender indicators reveal that, on average, women and non-binary individuals are significantly less optimistic about their performance compared to men. The coefficient on stereotype congruence reveals that, overall, individuals are significantly more confident in stereotype-congruent domains, extending the findings from past work to a sample that includes non-binary individuals (Coffman 2014). We estimate that a 1 SD increase in the stereotype congruence of the domain increases beliefs of absolute performance by a quarter of a point ($p < 0.001$). Finally, we can ask whether the predictive power of stereotype congruence varies across gender, interacting stereotype congruence with

Table 1: Regressions Predicting Believed Quiz Performance

	(1)	(2)	(3)	(4)	(5)	(6)
	Score	Rank	Score	Rank	Score	Rank
Women	-0.35** (0.13)	-0.20*** (0.047)	-0.73*** (0.12)	-0.32*** (0.041)	-0.73*** (0.12)	-0.32*** (0.041)
Non-Binary	-0.20 (0.16)	0.017 (0.054)	-0.81*** (0.14)	-0.20*** (0.047)	-0.83*** (0.14)	-0.21*** (0.047)
Business	0.60*** (0.086)	0.19*** (0.029)				
Women x Business	-0.76*** (0.12)	-0.24*** (0.041)				
Non-Binary x Business	-1.21*** (0.14)	-0.43*** (0.050)				
Stereotype Congruence			0.24*** (0.032)	0.074*** (0.010)	0.37*** (0.047)	0.12*** (0.014)
Women x Stereotype Congruence					-0.29*** (0.070)	-0.090*** (0.022)
Non-Binary x Stereotype Congruence					-0.058 (0.12)	-0.015 (0.041)
Score Fixed Effects	Y	Y	Y	Y	Y	Y
Constant	3.61*** (0.61)	1.84*** (0.16)	3.91*** (0.60)	1.94*** (0.16)	3.86*** (0.60)	1.92*** (0.16)
Observations	3,834	3,834	3,834	3,834	3,834	3,834
Clusters	1,917	1,917	1,917	1,917	1,917	1,917
Adjusted R-squared	0.331	0.232	0.331	0.231	0.332	0.232

Notes: Robust standard errors in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category (vis-a-vis business) is arts and literature. Omitted category for gender is men. “Score” is subject’s belief of how many correct answers they provided (0-14). “Rank” is subject’s response to, “How would you compare your performance to other Prolific workers who completed these quizzes?” from 1 “Far below average” to 5 “Far above average”. Controls are age and dummies for race. Stereotype congruence is self-reported masculinity in z-score units for business, and self-reported femininity in z-score units for arts and literature.

our gender indicators. Columns 5 and 6 reveal that stereotype-congruence has a similarly-sized impact on the beliefs of men and non-binary individuals (increasing performance beliefs by roughly one-third of a point for every 1 SD increase in stereotype congruence), but less of an impact on the beliefs of women in our sample. These results suggest that gender stereotypes influence beliefs about expertise for non-binary individuals, not just for men and women. Future work should expand on these findings by exploring a broader array of domains and directly eliciting perceived stereotype congruence for non-binary individuals.

Finally, turning attention to beliefs about the performance of others in Business and Arts, we see evidence consistent with gender-stereotyping. Figure 7’s short-dashed line shows average beliefs about performance of that group. First, note that beliefs about others overestimate performance generally (this line is higher than actual score or beliefs about own score), consistent with Bordalo et al. (2019). Next, note that respondent beliefs exaggerate the true difference in performance for men and women, over-estimating the extent to which men out-perform women in Business and the extent to which women out-perform men in Arts.

Individuals hold inaccurate beliefs about the performance of non-binary individuals. They falsely believe that non-binary individuals perform significantly worse in Business than men ($p < 0.001$ from paired t-test) or women ($p < 0.001$ from paired t-test). In Arts, respondents believe that non-binary individuals outperform men by more than they actually do, and that they are outperformed by women by more than they actually are. Better understanding the sources and content of the stereotypes people hold about the aptitudes of non-binary individuals is an important topic for future work.

4.3 Social Preferences: Altruism, trust, reciprocity, and deception

4.3.1 Motivation and design

A large literature explores the social preferences that inform interpersonal interactions. It is difficult to develop a short set of survey measures that captures the many complexities of social preferences. We choose to focus on measures of altruism, trust, reciprocity, and willingness to deceive others. Many have explored gender differences in these dimensions, with mixed results.

While many believe that women are more altruistic and generous than men (Niederle 2016; Shurchkov and Eckel 2018), the empirical evidence is more nuanced (Exley et al. 2022). There is evidence showing that men’s social preferences are more efficiency-focused while women’s social preferences are more equality-focused on average (Andreoni and Vesterlund 2001; Brañas-Garza et al. 2018; Doñate-Buendía et al. 2022). A meta-analysis of studies of

the dictator game suggests a modest but statistically significant gender gap in giving, with women giving more than men (Bilén et al. 2021).

To measure altruism, we implement the altruism measure used by Falk et al. (2018, 2023) in their global preferences survey. This measure asks participants how willing they are to give to good causes without expecting anything in return. Participants answer on a 0 - 10 scale, where 0 is very unwilling and 10 is very willing. The measure was validated by Falk et al. (2018) as corresponding to incentivized measures. Moreover, Falk et al. (2018, 2023) document significant gender differences in responses to this question in their global preferences survey, with women indicating more willingness to give than men.

Another important dimension of social preferences is trust. Some studies have found that women are more trusting, on average, than men and that women are more likely than men to cooperate in social dilemmas (Croson and Gneezy 2009; Gneezy and Rustichini 2004; Eckel and Grossman 2008). But, this finding is not universal. Chaudhuri and Sbai (2013) find no significant differences in trusting behavior, while Dittrich (2015) and Garbarino and Slonim (2009) find men to be more trusting than women on average. The evidence on gender differences in reciprocity is clearer, with many existing studies pointing to women behaving more reciprocally than men (Garbarino and Slonim 2009). In terms of trustworthiness, studies have shown that men are more likely to violate trust and behave unethically in economic contexts (Houser and Schunk 2010). Similarly, women have been found to be less likely to lie or engage in deception than men (Gneezy 2005; Abbink and Hennig-Schmidt 2006). Capraro (2018) presents a meta-analysis of the literature, revealing that men are more likely to lie on average, both in terms of “black” lies (benefits the deceiver at the expense of the recipient) and “white” lies (benefits the recipient only).

We use the trust measure used by both the General Social Survey and the World Values Survey: “Generally, would you say that you cannot be too careful when dealing with people, or that most people can be trusted?” Participants answer on a 0 (cannot be trusted) to 10 (can be trusted) scale. A second measure of trust asks respondents whether they “assume that people have only the best intentions” on a 0 (none of the time) to 10 (all of the time) scale. Using this measure, Falk et al. (2018) find women to be significantly more trusting than men. Importantly, previous work has found significant correlations between survey measures and incentivized behavioral measures of trust (Aksoy et al. (2018)).

To gauge positive and negative reciprocity, we again follow Falk et al. (2018). The positive reciprocity question asks, “When someone does me a favor, I am willing to return it,” with participants responding on a 0 (very unwilling) to 10 (very willing) scale. For negative reciprocity, we ask, “If I am treated very unjustly, I will take revenge at the first occasion, even if there is a cost to do so,” with participants again responding on a 0 (very

unwilling) to 10 (very willing) scale. In their global data, Falk et al. (2018) find women to be significantly more willing to engage in positive reciprocity and significantly less willing to engage in negative reciprocity using these measures.

Finally, we ask about willingness to deceive, “If it benefited you, how willing would you be to lie or deceive?” with the same 0 - 10 response scale.

4.3.2 Social Preferences Results: Non-binary gender differences

Figure 8 displays the results for each measure. Non-binary individuals, as well as men, generally appear less prosocial than women: Women have the highest altruism, highest positive reciprocity, and lowest negative reciprocity. However, the relative ordering of non-binary individuals compared to men is not consistent; the preferences of non-binary individuals are not always between the preferences of men and women. Further, in contrast to other domains, the inclusion of controls for age and race matters more here. Finally, for the two measures of trust, we do not find consistent gender differences.

Non-binary individuals are in between women and men in measured altruism, and are closer to men. The self-reported willingness to give by non-binary individuals is 7.2 on our 0-10 point scale, which is significantly lower than women’s 7.8 ($p < 0.01$) and marginally higher than men’s 7.0 ($p < 0.10$). The differences may be economically meaningful, as the difference between non-binary individuals and women is 0.22 SDs (the standard deviation of the altruism measure is 2.4).

Non-binary individuals report significantly lower levels of positive reciprocity than women (8.2 versus 8.6, a 0.19 SD difference, $p < 0.01$), and insignificantly lower levels than men (who report 8.4, $p = 0.19$ in comparison to non-binary). Similarly for negative reciprocity, non-binary individuals report higher levels compared to women (2.9 versus 2.1, a difference of 0.28 SDs, $p < 0.01$) but insignificantly lower levels than men (who have 3.1, a 0.9 SD difference, $p = 0.16$ in comparison to non-binary).

The regression estimates in Appendix Table A9 show results with and without pre-registered controls. Many of the unconditional differences are not robust to adding age and race controls. In these specifications, non-binary individuals are not significantly different from women on altruism, positive reciprocity, or negative reciprocity; non-binary individuals still report more altruism than men, and their lower level of negative reciprocity than men becomes statistically significant ($p < 0.01$). It seems that age is a key explanatory factor in interpreting differences in social preferences across genders.

The pattern for trust is less clear. Non-binary individuals fall between men in women in whether they think others can be trusted: 5.2 for non-binary, versus 5.0 for women (less than 0.1 SD different, $p = 0.12$) and 5.4 for men ($p = 0.25$). Women are significantly less

trusting than men on this measure. ($p < 0.01$) For the second measure of trust, non-binary individuals are least likely to assume good intentions in others (4.7, versus 4.9 for women, 5.0 for men, relative to a standard deviation of 2.4) but these differences are not statistically significant.

Finally, non-binary individuals report a higher level of willingness to engage in deception for their own benefit. Their average reported willingness to lie is 4.6, compared to 3.2 for women ($p < 0.001$) and 3.7 for men ($p < 0.001$). This is more than 0.4 SDs greater than the average preference of men and women.²⁹ Note our measures are consistent with previous findings that men are more willing to deceive than women ($p < 0.001$) (Gneezy 2005; Abbink and Hennig-Schmidt 2006). Adding controls for age and race (Appendix Table A9) substantially diminishes but does not eliminate these differences.

4.3.3 Social Preferences Results: Beliefs about non-binary population

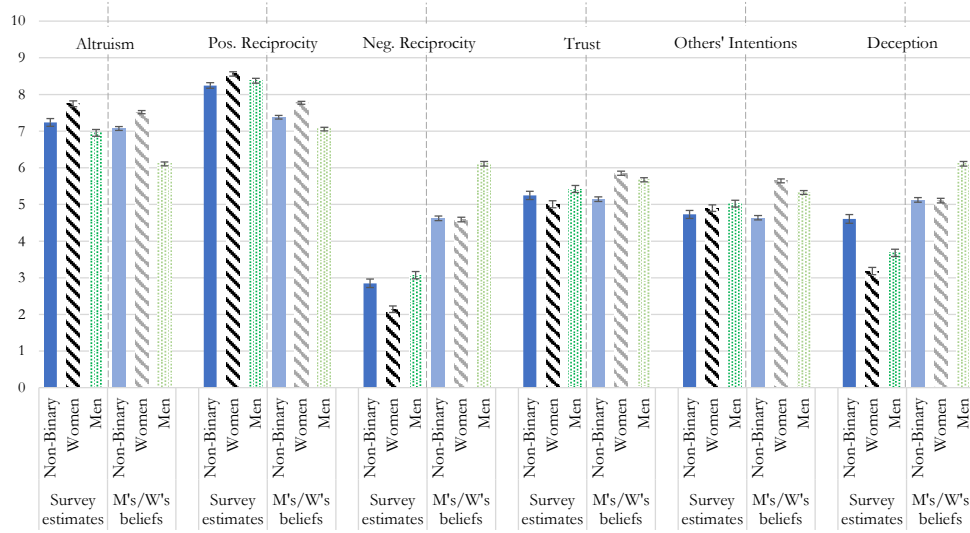
While misperceptions of the social preferences of men and women typically take the form of exaggeration of more modest differences, misperceptions of the social preferences of non-binary individuals are less coherent and characterized by substantial degrees of inaccuracy. Figure 9 plots actual and perceived differences between non-binary individuals and men and women.

Participants tend to believe non-binary individuals have intermediate levels of pro-social preferences, between those of men and women. They believe that non-binary individuals display significantly less altruism and less positive reciprocity than women, but more altruism and positive reciprocity than men. In terms of negative reciprocity and willingness to deceive, respondents believe that non-binary individuals' preferences are quite similar to women's (perceived differences around zero); in reality, non-binary individuals have a higher level of negative reciprocity than women, closer to men's; and their willingness to deceive exceeds even men's significantly. In general, individuals do not seem to accurately predict how the other-regarding preferences of non-binary individuals compare to men's and women's, either in terms of direction or magnitude.

Perceptions of differences in trust are also largely inaccurate. People under-estimate how trusting non-binary individuals are relative to others, believing that they will be significantly and meaningfully less likely to trust (by 0.7 points compared to women) and less likely to assume good intentions (by 1.0 points compared to women). Moreover, in contrast to what

²⁹Future work might seek to better understand these differences. While we can only speculate, one possibility is that, within the context of our survey, non-binary individuals may have been primed to consider instances where they chose to not disclose their gender, leading them to be more likely to recall cases where they "lied" for their own benefit.

Figure 8: Altruism, Reciprocity, Trust, and Deception

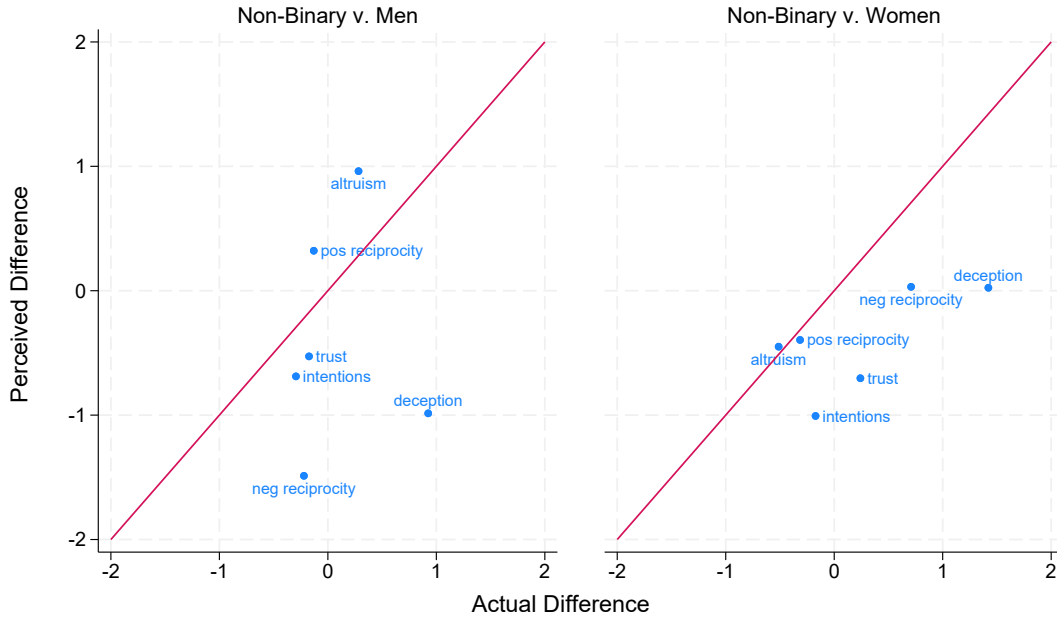


Notes: Reports average responses for each social preference measure. “Survey estimates” (on the left in each grouping, in the opaque bars) are subjects’ reports for themselves. “M’s/W’s beliefs” (on the right in each grouping, in the more transparent bars) report beliefs of men and women of how each gender responded on average. All items are on a 0-10 scale. Altruism: “How willing are you to give to good causes without expecting anything in return?” Trust in People: “Generally, would you say that you cannot be too careful when dealing with people, or that most people can be trusted?” Trust (Assume Best Intentions): “I assume that people have only the best intentions”. Positive reciprocity: “When someone does me a favor, I am willing to return it.” Negative reciprocity: “If I am treated very unjustly, I will take revenge at the first occasion, even if there is a cost to do so.” Deception: “If it benefited you, how willing would you be to lie or deceive?” Robust standard errors shown throughout.

we observe, respondents believe that women are significantly more trusting and more likely to assume good intentions than others.

Finally, we see evidence of gender stereotyping exaggerating the differences between men and women (See Figure 9 as well as Table A10 in the Appendix for all regression estimates including with pre-registered controls). While the observed difference in altruism (willingness to give) between men and women is roughly 0.8 points, individuals believe it is almost twice as large at 1.4 points. Similarly, while the observed difference between men and women is just 0.2 points for positive reciprocity and 1.0 points for negative reciprocity, respondent beliefs exaggerate these differences, estimating them at 0.7 points and 1.5 points, respectively. They also over-estimate the gender gap in willingness to lie, believing it is nearly twice as large as actually observed (1.0 points versus 0.5 points).

Figure 9: Actual and Perceived Gender Differences in Social Preferences



Notes: Compares non-binary individuals with men (left) and women (right) on each social preference measure (0 to 10 scale). The x-axis presents the actual difference between non-binary individuals and the other gender, while the y-axis is the perceived difference (measured among men and women). 45 degree line is also plotted.

4.4 Risk and time preferences

4.4.1 Motivation and design

Preferences over risk and time form the foundation of many models of economic decision-making, including those around human capital investment and career choice. Thus, differences in preferences in these dimensions could contribute to differences in economic outcomes.

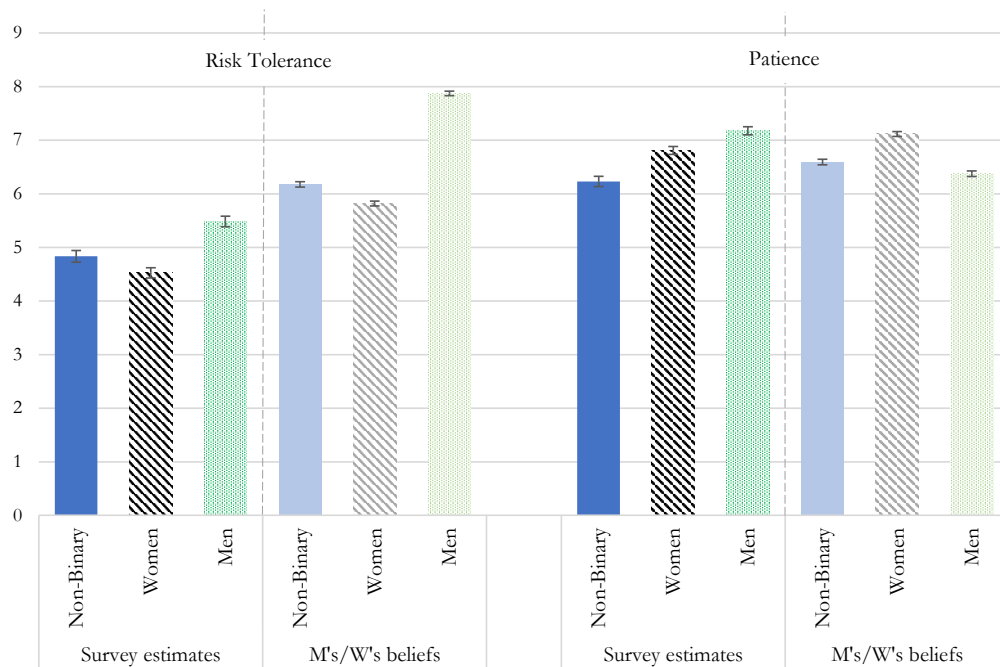
Both of these fundamental preferences have been shown to vary between men and women. Research has found that women tend to be more risk-averse than men (Croson and Gneezy 2009; Falk et al. 2023) (See Shurchkov and Eckel (2018) for a thorough survey and discussion of explanations) though this finding is not universal and effect sizes might be smaller than previously posited (Byrnes et al. 1999; Niederle 2016; Filippin and Crosetto 2016). Evidence on time preferences is mixed. There is evidence that women are on average more patient than men (Dittrich and Leipold 2014) and exhibit less time inconsistency (Prince and Shawhan 2011), but other work suggests women are more impatient (Falk et al. 2018). We measure risk and time using the elicitation used in the Global Preferences Survey, designed and validated by Falk et al. (2018, 2023). Note the patience question measures willingness to delay from

“today” to the “future”.

4.4.2 Risk and time preference results: Non-binary gender differences

Non-binary respondents differ from both men and women in their preferences over risk and time. Further, there is not a consistent ordering by gender. For risk, the non-binary group falls in-between while for patience, they are one of the extremes.

Figure 10: Risk Tolerance and Patience



Notes: Reports average responses for our measures of risk and time preferences. “Survey estimates” (on the left in each grouping, in the opaque bars) are subjects’ reports for themselves. “M’s/W’s beliefs” (on the right in each grouping, in the more transparent bars) report beliefs of men and women of how each gender responded on average. Both items are on a 0-10 scale (0 = Very unwilling; 10 = Very willing). Risk: “Generally, how willing or unwilling you are to take risks.” Time: “How willing are you to give up something that is beneficial for you today in order to benefit more in the future?” Robust standard errors shown throughout.

Figure 10 shows estimates for self-reported preferences over time and risk, as well as beliefs of others’ preferences, by gender. The three leftmost bars show mean self-reported risk preferences. Non-binary respondents report risk preferences that on average, are neither very risk-loving or averse, 4.8 on a 0 – 10 scale. This is 0.31 greater, i.e. more risk-tolerant, than the average for women, equal to 0.12 S.D. ($p = 0.04$) while men report an average risk tolerance 0.25 S.D. greater than non-binary respondents (a difference of 0.65, $p < 0.01$).³⁰

³⁰Note that we replicate earlier findings that men are more risk-tolerant than women: Their average report is 0.37 S.D. greater, i.e. 0.96 units, with $p < 0.01$.

Regression estimates in Appendix Table A11 show that including pre-registered controls does not change these patterns.

The first three bars on the right in Figure 10 represent mean self-reported impatience. Non-binary respondents disclose the most impatience. The non-binary group average of 6.2 denotes a slight average “willingness to give up something that is beneficial. . . today in order to benefit more in the future.” However, both women (0.58 units, 0.28 S.D., $p < 0.01$) and men (0.95 units, 0.46 S.D., $p < 0.01$) report substantially and significantly higher levels of willingness to delay reward.³¹ These differences are reduced, but not eliminated, when adding controls for age and race (Appendix Table A11).

4.4.3 Risk and time preference results: Beliefs about non-binary population

To understand stereotypes, we also measured beliefs of risk and time preferences of each group. We find stereotypes of risk preferences are directionally accurate but exaggerated while stereotypes of time preferences are inaccurate.

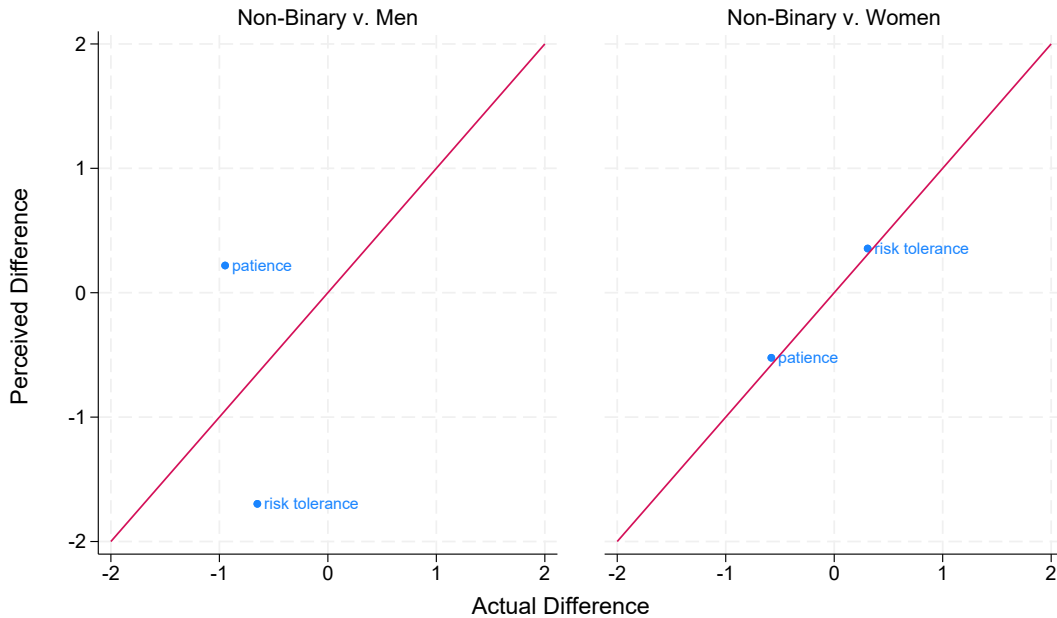
Beliefs held by men and women of risk preferences for each gender are the more transparent bars on the left in Figure 10 (Also see Table A12 in the Appendix for all belief regression estimates including with pre-registered controls). Beliefs are consistent with the ordering found in self-reports, i.e. men most risk tolerant and women least so, but the believed differences are an exaggeration of the truth. Men and women believe men to be dramatically more risk-loving than women (a difference of 2.05 $p < 0.001$) or non-binary individuals (a difference of 1.69 $p < 0.001$). Finally, men and women believe non-binary people to be slightly more risk tolerant than women (0.36, $p < 0.001$).

Beliefs of time preferences, however, do not align with observed differences in self-reported patience. Whereas men reported the most patience and non-binary the least, men and women believe women are the most patient and men are the most impatient: Beliefs of women’s patience is 7.11 compared to beliefs of 6.6 of non-binary patience ($p < 0.01$), and men and women believe men to be further more impatient than non-binary people at an average of 6.37 ($p < 0.01$).

Figure 11 shows how inaccurate beliefs are of the difference between non-binary respondents and men (left figure) as well as between non-binary respondents and women (right figure). Beliefs of the difference between non-binary respondents and women are largely accurate as seen by both dots in the right figure falling on the 45-degree line. However, beliefs of the difference between non-binary people and men are much more inaccurate as can be seen by both dots falling far from the 45-degree line in the left figure.

³¹Note that in our sample men report more patience than do women (0.37, 0.18 S.D., $p < 0.01$).

Figure 11: Actual and Perceived Gender Differences in Economic Preferences



Notes: Compares non-binary individuals with men (left) and women (right) on each social preference measure (0 to 10 scale). The x-axis presents the actual difference between non-binary individuals and the other gender, while the y-axis is the perceived difference (measured among men and women). 45 degree line is also plotted.

5 Conclusion

In this study of non-binary individuals, we show the feasibility of studying the economic preferences and experiences of gender minorities. Non-binary gender can successfully be measured, allowing us to uncover meaningful differences in economic attributes across gender identity.

Non-binary individuals have unique experiences. While they may be between women and men in self-reported masculinity and femininity, they report experiencing more extensive discrimination than women or men. Moreover, men and women report feeling more uncomfortable with non-binary individuals than with LGBT individuals, who themselves report experiencing harassment and hostility.

Our results reveal important insights into how the economic beliefs and preferences of non-binary individuals compare to men's and women's. Our findings reject naive models that conceptualize the economic attributes of non-binary individuals as “between” men's and women's. Across many attributes that social scientists have identified as being central to economic decision-making, we document significant differences between non-binary respondents

and others, in many cases with gaps of a similar order of magnitude to the male-female gap. While younger age explains some of the gaps we identify, others are robust. In particular, we find that, even conditional on age, non-binary respondents report significantly less competitiveness than men or women, risk tolerance between men's and women's, and less patience than men or women.

Our approach has been to take existing paradigms examining gender differences and see how the results extend once non-binary individuals are included. Our questions rely on previously developed questions that can be quickly asked in a survey, drawing on evidence that these questions are closely related to behavior elicited with more complex laboratory or field experiments. However, future work can examine the behavior of non-binary individuals in experimental settings. Moreover, additional research will be enabled as statistical agencies and other data providers begin to measure gender in more inclusive ways.

In recent years, social scientists have uncovered a variety of ways in which individual differences in beliefs and preferences can help to explain gender gaps in labor market outcomes. But, this work has largely been restricted to comparing women and men. Our results suggest that these same measures may be important in understanding gaps between non-binary individuals and others in terms of educational and workplace outcomes. Of course, despite our focus on gaps, it is worth noting explicitly the large degree of within-gender heterogeneity and across-gender overlap we observe in responses.

While it can be hard to interpret magnitudes on ordered scales, it is worth noting that the gaps we identify between non-binary respondents and others are, in many cases, of a similar order of magnitude to gaps between men and women. To the extent that these men-women gaps have been found to have predictive power for outcomes of interest, we might expect the differences we have identified to be informative and meaningful. We leave it to future work to pursue these important investigations.

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**Online Appendix for
Non-Binary Gender Economics**

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Appendix Tables

Appendix Table A1: Sample Construction

	Men	Women	Non-Binary
N Recruited in Each Category	750	750	542
... and Completed Survey	731	742	541
N Categorized By Own Gender Responses	750	769	490
... and Passed Attention Check	721	742	454

Notes: Sample sizes by gender at various stages. Recruitment categories were based on respondents' previous answers to Prolific gender identity questions. Respondents were classed as having completed the survey if they completed enough to get to the repeated gender question near the end of the survey (approximately 99% of the survey). In row three, we use information from respondents' answers to our gender identity questions to categorize them. They answer 2 gender identity questions in our survey plus the Prolific-administered question; in the case of divergence, if any two responses agree within-respondent, that is how they are categorized.

Appendix Table A2: Sample Characteristics

	Man or Male	Woman or Female	Non-Binary or Genderqueer	Total	American Comm. Survey
Age	39.0	43.2	28.2	38.1	39.0
<i>Race</i>					
American Indian or Alaska Native	0.7%	0.5%	1.5%	0.8%	
Asian	7.1%	4.9%	6.8%	6.2%	5.9%
Black or African American	12.3%	12.7%	5.3%	10.8%	12.2%
Native Hawaiian or other Pacific Islander	0.3%	0.1%	0.2%	0.2%	0.2%
Other/two or more races	4.7%	6.5%	14.3%	7.7%	
White	74.9%	75.3%	71.8%	74.3%	60.9%
<i>Education</i>					
Finished graduate school	13.7%	13.1%	8.4%	12.2%	14.0%
Some graduate school	2.8%	3.8%	4.6%	3.6%	
Finished college	41.7%	36.5%	34.6%	38.0%	21.6%
Some college	23.0%	31.3%	35.2%	29.1%	19.1%
Finished high school	17.1%	14.8%	13.4%	15.3%	26.1%
Some high school	1.7%	0.5%	3.7%	1.7%	5.7%
<i>Marital Status</i>					
Domestic partnership, not married	9.7%	13.9%	17.4%	13.1%	
Married	36.2%	40.6%	13.2%	32.4%	48%
Separated	2.2%	3.4%	0.4%	2.2%	1.7%
Single	51.9%	42.2%	68.9%	52.2%	52%
<i>Sex Assigned at Birth</i>					
Assigned female at birth	2.4%	97.4%	72.7%	55.8%	50.4%
Assigned male at birth	97.1%	2.2%	21.6%	42.5%	49.6%
<i>Sexual Orientation</i>					
Bisexual	8.5%	16.8%	38.8%	18.9%	
Gay or lesbian	6.0%	3.6%	17.8%	7.9%	
Straight	83.9%	74.8%	2.4%	61.1%	
Use different term	1.4%	4.0%	36.6%	10.7%	
Do not know	0.1%	0.3%	2.9%	0.8%	
Prefer not to answer	0.1%	0.4%	1.5%	0.6%	
<i>Employment</i>					
Choose not to work	6.4%	12.9%	7.3%	9.1%	
Disabled	1.7%	6.9%	8.6%	5.3%	
Unemployed and looking for job	12.3%	10.0%	19.6%	13.1%	
Working full time	66.0%	44.1%	32.4%	49.6%	60.3%
Working part time	13.6%	26.1%	32.2%	22.8%	16.6%
<i>Income</i>					
\$100,000 or more	13.1%	8.9%	3.0%	9.1%	21.6%
\$75,000-\$99,999	14.7%	8.6%	3.5%	9.7%	13.1%
\$50,000-\$74,999	20.8%	16.2%	9.7%	16.4%	23.8%
\$25,000-\$49,999	24.4%	31.1%	18.1%	25.5%	31.4%
Less than \$25,000	25.2%	33.2%	63.0%	37.2%	10%
Prefer not to say	1.7%	2.0%	2.6%	2.0%	
N	721 (37.6%)	742 (38.7%)	454 (23.7%)	1,917 (100.0%)	

Notes: Data for first four columns come from survey sample. Last column comes from the 2022 American Community Survey from the United States Census Bureau, and is blank when attribute is unmeasured or corresponding category does not exist. Race averages from ACS computed using reported counts by category. All other ACS averages reported by ACS.

Appendix Table A3: Life Aspirations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Working w people		Money		Helping community		Having children	
Man	0.36** (0.177)	0.18 (0.188)	0.92*** (0.150)	1.15*** (0.161)	-0.84*** (0.145)	-0.96*** (0.154)	2.71*** (0.198)	2.24*** (0.215)
Woman	0.36** (0.179)	0.15 (0.200)	0.50*** (0.151)	0.86*** (0.166)	-0.31** (0.140)	-0.47*** (0.156)	3.54*** (0.205)	2.92*** (0.235)
Age		0.01 (0.006)		-0.03*** (0.005)		0.008 (0.005)		0.036*** (0.007)
Black		0.81*** (0.219)		1.00*** (0.189)		0.62*** (0.185)		0.80*** (0.267)
Asian		-0.44 (0.259)		0.89*** (0.215)		-0.07 (0.234)		-0.12 (0.335)
Other race		-0.12 (0.253)		0.32 (0.213)		0.03 (0.209)		-0.17 (0.304)
Constant	4.88*** (0.141)	4.54*** (0.221)	5.55*** (0.118)	6.08*** (0.189)	7.16*** (0.108)	6.91*** (0.179)	2.07*** (0.142)	1.05*** (0.258)
Observations	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917

Notes: Table reports OLS estimates predicting self-reports of life aspirations. Robust standard errors in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for gender is non-binary. Omitted category for race is Caucasian. Question asked was, “How important is each of the following to you in your life?” with answers on a 0 “Not at all important” to 10 “Very important” scale. Prompts were, “Opportunities to work with people rather than things,” “Having lots of money,” “Helping other people in my community,” and “Having children”. Age in years.

Appendix Table A4: Discrimination Experience

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	School		Work/hiring		Medical Care		Police/Courts		Public		Online		Discrim.	Anywhere
Man	-0.64*** (0.053)	-0.59*** (0.056)	-0.47*** (0.052)	-0.51*** (0.056)	-0.64*** (0.052)	-0.61*** (0.055)	-0.34*** (0.046)	-0.35*** (0.049)	-0.70*** (0.051)	-0.68*** (0.054)	-0.82*** (0.054)	-0.69*** (0.057)	-1.02*** (0.053)	-0.94*** (0.056)
Woman	-0.30*** (0.054)	-0.23*** (0.060)	-0.0024 (0.055)	-0.066 (0.061)	-0.20*** (0.056)	-0.15** (0.062)	-0.21*** (0.046)	-0.22*** (0.052)	-0.30*** (0.053)	-0.26*** (0.058)	-0.56*** (0.055)	-0.38*** (0.062)	-0.48*** (0.052)	-0.38*** (0.058)
Age		-0.0045*** (0.0016)		0.0041** (0.0017)		-0.0039** (0.0015)		-0.00077 (0.0014)		-0.0038** (0.0015)		-0.013*** (0.0017)		-0.0073*** (0.0017)
Black		0.30*** (0.068)		0.32*** (0.068)		0.25*** (0.067)		0.48*** (0.065)		0.38*** (0.065)		0.32*** (0.074)		0.40*** (0.071)
Asian		-0.041 (0.078)		0.061 (0.082)		-0.12 (0.077)		-0.025 (0.068)		0.015 (0.080)		0.039 (0.093)		0.031 (0.090)
Other race		0.22*** (0.076)		0.22*** (0.076)		0.10 (0.076)		0.20*** (0.069)		0.070 (0.068)		0.12 (0.081)		0.19*** (0.074)
Constant	1.18*** (0.044)	1.26*** (0.067)	1.01*** (0.044)	0.84*** (0.066)	1.01*** (0.045)	1.10*** (0.066)	0.83*** (0.037)	0.80*** (0.056)	1.27*** (0.043)	1.34*** (0.065)	1.58*** (0.043)	1.90*** (0.068)	2.05*** (0.038)	2.20*** (0.066)
Observations	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917

Notes: Table reports OLS estimates predicting self-reports of discrimination in each context listed. Robust standard errors in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for gender is non-binary. Omitted category for race is Caucasian. Question asked was, “Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following situations because of your gender / gender identity?” with answers on a 0 “Never” to 3 “Frequently” scale. “Anywhere” is equivalent to the maximum of the six contexts for each individual. Age in years.

Appendix Table A5: Beliefs About Discrimination Experience

	(1)	(2)
	Beliefs About Experienced Discrimination	
Beliefs held by:	Men & Women	Non-binary
Beliefs about Men	-1.21*** (0.031)	-1.74*** (0.044)
Beliefs about Women	-0.26*** (0.020)	-0.16*** (0.027)
Constant	2.37*** (0.023)	2.77*** (0.023)
Observations	4,389	1,362
Clusters	1,463	454

Notes: Table reports OLS estimates predicting beliefs held by each group of experienced discrimination responses. Standard errors clustered at individual level in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for target gender is non-binary. Perceived discrimination question was “How often do you feel that each of the following groups is discriminated against?” with answers on a 0 “Never” to 3 “Often” scale. Participants reported their belief of average response for each gender group. Age in years.

Appendix Table A6: Inclusion at Work: Gartner Inclusion Index

	(1)	(2)	(3)	(4)
	Index as simple sum		Index as sum of z-scores	
Man	9.08*** (1.00)	7.57*** (1.06)	3.25*** (0.36)	2.70*** (0.38)
Woman	7.15*** (1.02)	5.20*** (1.13)	2.56*** (0.37)	1.86*** (0.41)
Age		0.11*** (0.03)		0.04*** (0.01)
Black		3.62*** (1.11)		1.29*** (0.40)
Asian		2.59 (1.36)		0.92 (0.49)
Other race		-0.21 (1.55)		-0.09 (0.53)
Constant	35.73*** (0.82)	32.20*** (1.25)	-2.22*** (0.30)	-3.49*** (0.45)
Observations	1,917	1,917	1,917	1,917

Notes: Table reports OLS estimates predicting self-reports for each measure listed. Robust standard errors in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for gender is non-binary. Omitted category for race is Caucasian. “Constant” includes adjustment for white/Caucasian in models 2 and 4. Gartner Inclusion Index is comprised of degree of agreement with seven prompts: “I feel welcome to express my true feelings at work,” “Employees at my organization respect and value each other’s opinions,” “Employees at my organization who help the organization achieve its strategic objectives are rewarded and recognized fairly,” “Members of my team fairly consider ideas and suggestions offered by other team members,” “Communication we receive from the organization is honest and open,” “People in my organization care about me,” and “Managers at my organization are as diverse as the broader workforce.” Each item on a 0-10 scale. Simple sum index is the sum of each item. The z-score index is the sum of the z-scored responses for each item. Age in years.

Appendix Table A7: Self-Assertion

hline	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Self-assertion mean		Competitive		Self-efficacy		WT Negotiate		Avoid Non-promotable	
Man	0.68*** (0.075)	0.60*** (0.080)	1.44*** (0.16)	1.37*** (0.17)	0.31** (0.12)	0.19 (0.13)	0.77*** (0.16)	0.56*** (0.17)	0.19 (0.12)	0.29** (0.13)
Woman	0.17** (0.076)	0.070 (0.083)	0.52*** (0.16)	0.43** (0.18)	0.017 (0.12)	-0.16 (0.14)	0.17 (0.16)	-0.15 (0.17)	-0.0041 (0.12)	0.16 (0.13)
Age		0.0066*** (0.0024)		0.0046 (0.0052)		0.013*** (0.0038)		0.020*** (0.0047)		-0.011*** (0.0039)
Black		0.29*** (0.096)		0.60*** (0.20)		0.14 (0.15)		0.35 (0.19)		0.063 (0.17)
Asian		0.0036 (0.12)		0.14 (0.24)		-0.039 (0.20)		-0.57** (0.24)		0.48** (0.20)
Other race		0.18 (0.11)		0.26 (0.23)		0.30 (0.18)		0.26 (0.21)		-0.095 (0.17)
Constant	4.96*** (0.059)	4.73*** (0.092)	4.41*** (0.12)	4.19*** (0.20)	7.03*** (0.096)	6.61*** (0.15)	5.53*** (0.13)	4.94*** (0.19)	2.89*** (0.090)	3.18*** (0.15)
Observations	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917

Notes: Table reports OLS estimates predicting self-reports for each measure listed. Robust standard errors in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for gender is non-binary. Omitted category for race is Caucasian. “Self-assertion mean” is the average of the four other items. Competitiveness: “How competitive do you consider yourself to be?” Self-efficacy: “Can you solve most problems if you invest the necessary effort?” Negotiation: “Generally, are you someone who is willing or unwilling to initiate a negotiation?” Avoid Non-promotable: “How likely are you to be the one to do a thankless, but necessary, task in a group?” (to measure avoidance, ie self-assertion, we report 10-response here). All on 0-10 scale. Age in years.

Appendix Table A8: Beliefs About Self-Assertion

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		
	Self-assertion mean		Competitive		Self-efficacy		WT Negotiate		Avoid Non-promotable		Men & Women		Men & Women		Men & Women		Men & Women		Non-binary		
Beliefs held by:	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Non-binary
Beliefs about Men	1.42*** (0.034)	1.76*** (0.065)	2.23*** (0.052)	2.43*** (0.086)	1.00*** (0.046)	1.35*** (0.087)	1.50*** (0.068)	1.13*** (0.15)	0.95*** (0.067)	2.13*** (0.10)											
Beliefs about Women	0.048** (0.022)	0.062 (0.035)	0.38*** (0.041)	0.26*** (0.065)	0.30*** (0.033)	0.35*** (0.049)	0.31*** (0.042)	0.45*** (0.067)	-0.80*** (0.044)	-0.81*** (0.068)											
Constant	5.51*** (0.027)	5.28*** (0.045)	5.65*** (0.050)	5.44*** (0.078)	7.03*** (0.049)	6.92*** (0.079)	6.10*** (0.054)	5.94*** (0.091)	3.25*** (0.053)	2.82*** (0.078)											
Observations	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	454
Clusters	1,463	454	1,463	454	1,463	454	1,463	454	1,463	454	1,463	454	1,463	454	1,463	454	1,463	1,463	1,463	454	454

Notes: Table reports OLS estimates predicting beliefs held by each group listed for each measure listed. Standard errors clustered at individual level in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for target gender is non-binary. "Self-assertion mean" is the average of the four other items. Competitiveness: "How competitive do you consider yourself to be?" Self-efficacy: "Can you solve most problems if you invest the necessary effort?" Negotiation: "Generally, are you someone who is willing or unwilling to initiate a negotiation?" Avoid Non-promotable: "How likely are you to be the one to do a thankless, but necessary, task in a group?" (to measure avoidance, ie self-assertion, we report 10-response here). All on 0-10 scale. Participants reported their belief of average response for each gender group. Age in years.

Appendix Table A9: Social Preferences, Reciprocity, and Deception

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Altruism		Pos. Reciprocity	Neg. Reciprocity	Trust	Others' Intentions	Deception					
Man	-0.28** (0.14)	-0.65*** (0.15)	0.13 (0.099)	-0.10 (0.11)	0.22 (0.15)	0.57*** (0.16)	0.17 (0.15)	0.024 (0.16)	0.29** (0.14)	-0.073 (0.15)	-0.92*** (0.15)	-0.28 (0.16)
Woman	0.51*** (0.13)	-0.015 (0.14)	0.31*** (0.097)	-0.023 (0.11)	-0.71*** (0.15)	-0.21 (0.16)	-0.24 (0.15)	-0.43*** (0.17)	0.17 (0.14)	-0.31 (0.16)	-1.42*** (0.15)	-0.52*** (0.17)
Age		0.033*** (0.0042)		0.023*** (0.0031)		-0.033*** (0.0049)		0.013*** (0.0049)		0.030*** (0.0045)		-0.062*** (0.0049)
Black		0.37** (0.17)		-0.13 (0.14)		0.73*** (0.21)		-0.36 (0.21)		0.060 (0.19)		0.38 (0.22)
Asian		-0.87*** (0.22)		-0.15 (0.14)		0.69*** (0.24)		0.24 (0.22)		0.48** (0.21)		-0.10 (0.23)
Other race		0.20 (0.20)		0.11 (0.14)		0.44** (0.22)		-0.35 (0.23)		-0.39 (0.21)		-0.059 (0.23)
Constant	7.24*** (0.10)	6.31*** (0.17)	8.24*** (0.076)	7.58*** (0.13)	2.85*** (0.12)	3.62*** (0.19)	5.25*** (0.11)	4.94*** (0.19)	4.73*** (0.11)	3.92*** (0.18)	4.61*** (0.12)	6.35*** (0.18)
Observations	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917

Notes: Table reports OLS estimates predicting self-reports for each measure listed. Robust standard errors in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for gender is non-binary. Omitted category for race is Caucasian. Altruism: "How willing are you to give to good causes without expecting anything in return?" Trust in People: "Generally, would you say that you cannot be too careful when dealing with people, or that most people can be trusted?" Trust (Assume Best Intentions): "I assume that people have only the best intentions". Positive reciprocity: "When someone does me a favor, I am willing to return it." Negative reciprocity: "If I am treated very unjustly, I will take revenge at the first occasion, even if there is a cost to do so." Deception: "If it benefited you, how willing would you be to lie or deceive.?" All on 0-10 scale. Age in years.

Appendix Table A10: Beliefs About Social Preferences, Reciprocity, and Deception

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)	
	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary	Men & Women	Non-binary
Beliefs about Men	-0.96*** (0.059)	-2.34*** (0.11)	0.53*** (0.063)	0.38*** (0.14)	0.69*** (0.058)	0.69*** (0.13)	-0.32*** (0.050)	-1.46*** (0.096)	1.49*** (0.065)	2.21*** (0.12)	0.99*** (0.055)	1.70*** (0.10)												
Beliefs about Women	0.45*** (0.043)	-0.055 (0.057)	0.70*** (0.048)	0.33*** (0.072)	1.01*** (0.046)	0.31*** (0.071)	0.40*** (0.036)	0.11*** (0.044)	-0.031 (0.046)	0.23*** (0.070)	-0.024 (0.041)	0.25*** (0.065)												
Constant	7.07*** (0.052)	7.40*** (0.079)	5.15*** (0.063)	4.73*** (0.10)	4.64*** (0.057)	4.30*** (0.090)	7.38*** (0.049)	7.53*** (0.072)	4.62*** (0.064)	4.52*** (0.100)	5.13*** (0.063)	5.46*** (0.097)												
Observations	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362	4,389	1,362												
Clusters	1,463	454	1,463	454	1,463	454	1,463	454	1,463	454	1,463	454												

Notes: Table reports OLS estimates predicting beliefs held by each group listed for each measure listed. Standard errors clustered at individual level in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for target gender is non-binary. Altruism: “How willing are you to give to good causes without expecting anything in return?” Trust in People: “Generally, would you say that you cannot be too careful when dealing with people, or that most people can be trusted?” Trust (Assume Best Intentions): “I assume that people have only the best intentions”. Positive reciprocity: “When someone does me a favor, I am willing to return it.” Negative reciprocity: “If I am treated very unjustly, I will take revenge at the first occasion, even if there is a cost to do so.” Deception: “If it benefited you, how willing would you be to lie or deceive?” All on 0-10 scale. Participants reported their belief of average response for each gender group. Age in years.

Appendix Table A11: Risk and Time Preferences

	(1)	(2)	(3)	(4)
	Risk Tolerance		Impatience	
Man	0.65*** (0.15)	0.67*** (0.16)	0.95*** (0.12)	0.73*** (0.13)
Woman	-0.31** (0.14)	-0.28* (0.16)	0.58*** (0.12)	0.29** (0.14)
Age		-0.0049 (0.0050)		0.018*** (0.0038)
Black		0.95*** (0.19)		0.15 (0.14)
Asian		-0.12 (0.24)		0.20 (0.19)
Other race		0.35* (0.21)		-0.10 (0.18)
Constant	4.83*** (0.11)	4.87*** (0.19)	6.23*** (0.095)	5.71*** (0.15)
Observations	1,917	1,917	1,917	1,917

Notes: Table reports OLS estimates predicting self-reports for each measure listed. Robust standard errors in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for gender is non-binary. Omitted category for race is Caucasian. Risk: “Generally, how willing or unwilling you are to take risks.” Time: “How willing are you to give up something that is beneficial for you today in order to benefit more in the future?” Both on 0-10 scale. Age in years.

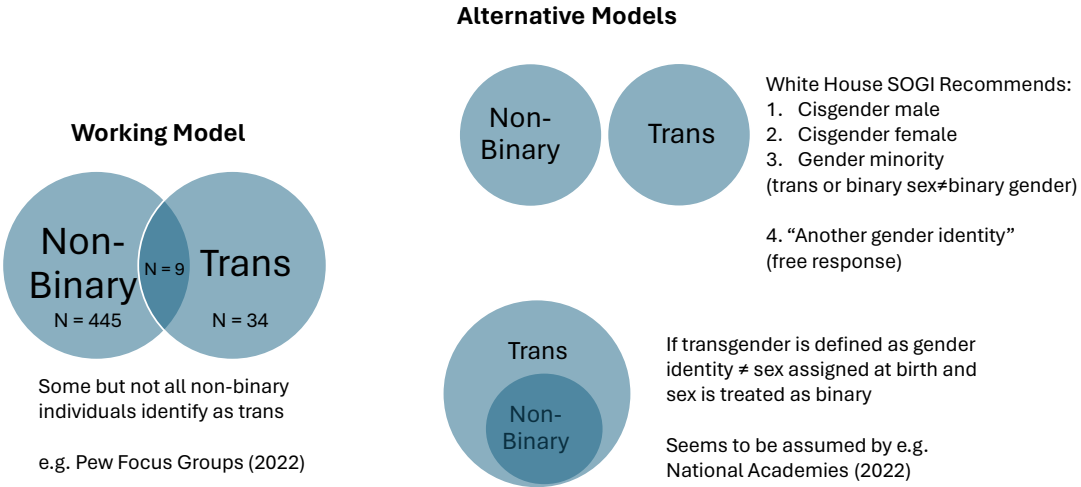
Appendix Table A12: Beliefs About Risk and Time Preferences

	(1)	(2)	(3)	(4)
	Risk Tolerance		Impatience	
Beliefs held by:	Men & Women	Non-binary	Men & Women	Non-binary
Beliefs about Men	1.70*** (0.055)	1.91*** (0.099)	-0.22*** (0.057)	-1.27*** (0.12)
Beliefs about Women	-0.36*** (0.045)	-0.25*** (0.073)	0.52*** (0.041)	0.17*** (0.064)
Constant	6.17*** (0.051)	6.06*** (0.086)	6.59*** (0.051)	6.78*** (0.078)
Observations	4,389	1,362	4,389	1,362
Clusters	1,463	454	1,463	454

Notes: Table reports OLS estimates predicting beliefs held by each group listed for each measure listed. Standard errors clustered at individual level in parentheses. ** and *** denote $p < 0.05$ and $p < 0.01$ respectively. Note * and the $p < 0.1$ threshold are not used. Omitted category for target gender is non-binary. Risk: “Generally, how willing or unwilling you are to take risks.” Time: “How willing are you to give up something that is beneficial for you today in order to benefit more in the future?” Both on 0-10 scale. Participants reported their belief of average response for each gender group. Age in years.

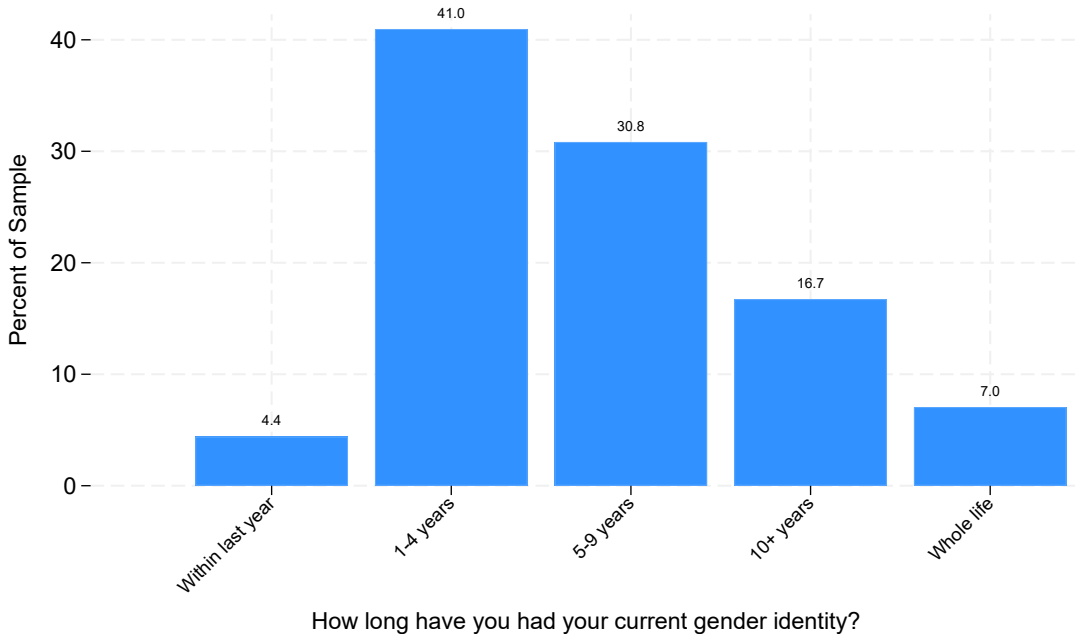
Appendix Figures

Appendix Figure A1: Defining and Situating the Non-Binary Population in the Literature



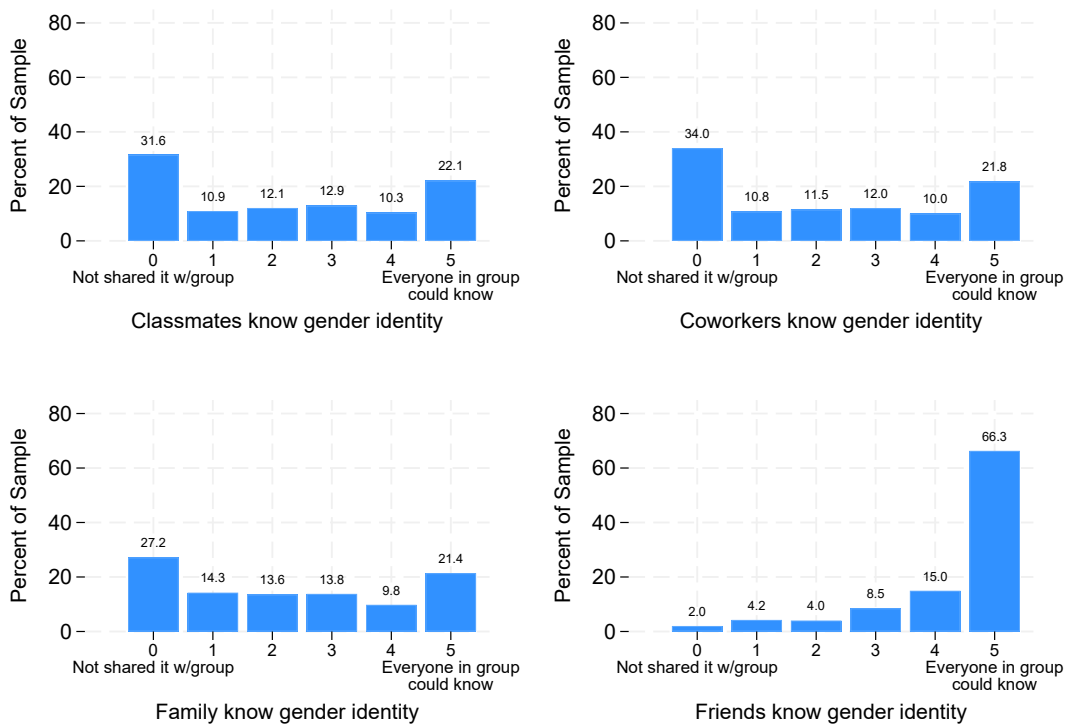
Notes: Data: survey sample

Appendix Figure A2: Length of Time Non-Binary Respondents Have Current Gender Identity



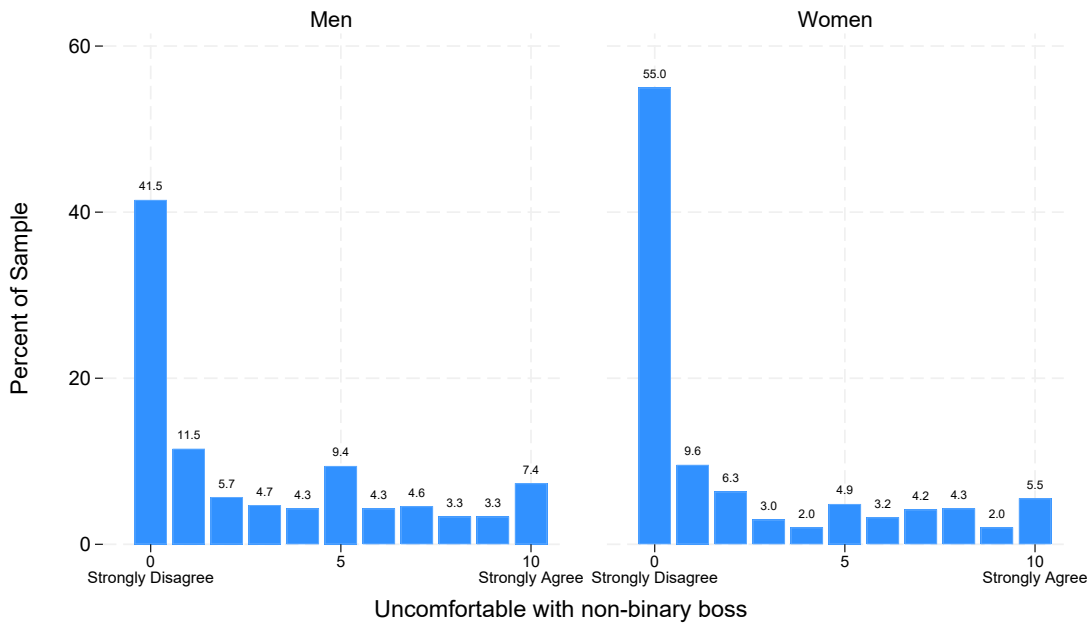
Notes: Non-Binary Sample only. Respondents answered: “With respect to your current gender identity, how long have you had that identity?”

Appendix Figure A3: Extent of Non-Binary Identity Disclosure



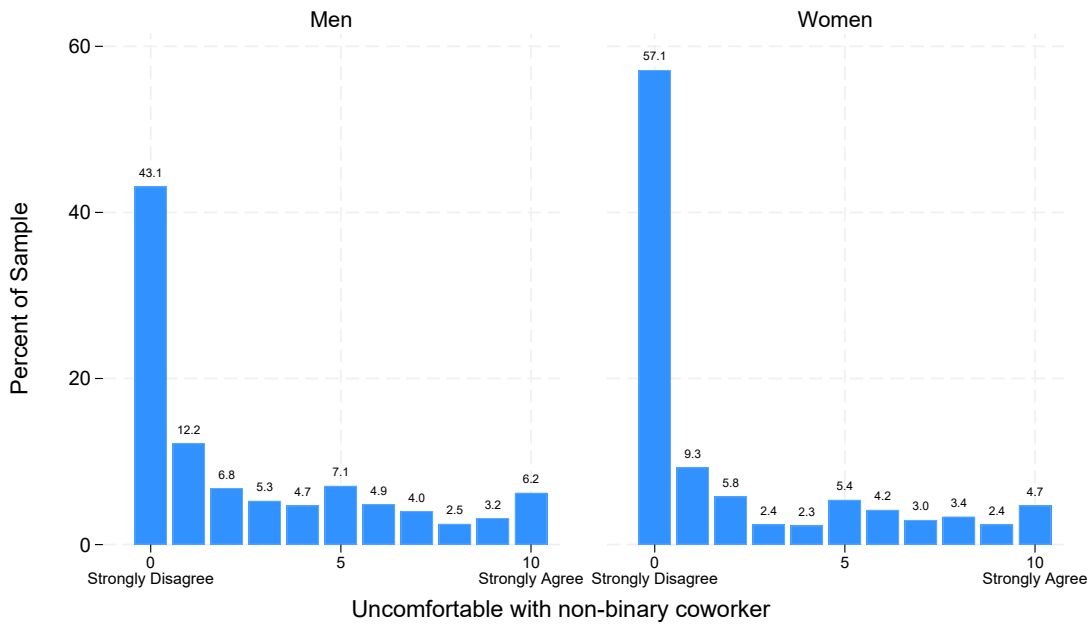
Notes: Non-Binary Sample only. Respondents answered: “How many of the members of the groups below know about your gender identity?” Answers of “Not Applicable” excluded.

Appendix Figure A4: Discomfort with Non-Binary Boss



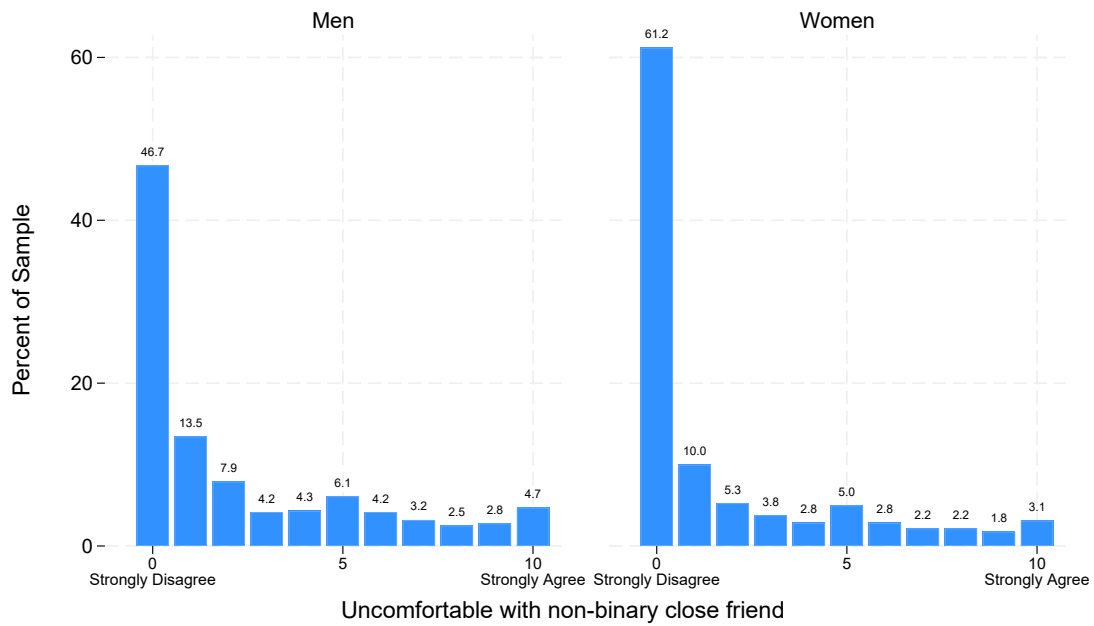
Notes: Sample: Men and Women only. Respondents rated their agreement (0 = Strongly disagree; 10 = Strongly agree) with the statement: “I would be uncomfortable if my boss was non-binary.”

Appendix Figure A5: Discomfort with Non-Binary Co-worker



Notes: Sample: Men and Women only. Respondents rated their agreement (0 = Strongly disagree; 10 = Strongly agree) with the statement: “I would feel uncomfortable working closely with a non-binary person in my workplace..”

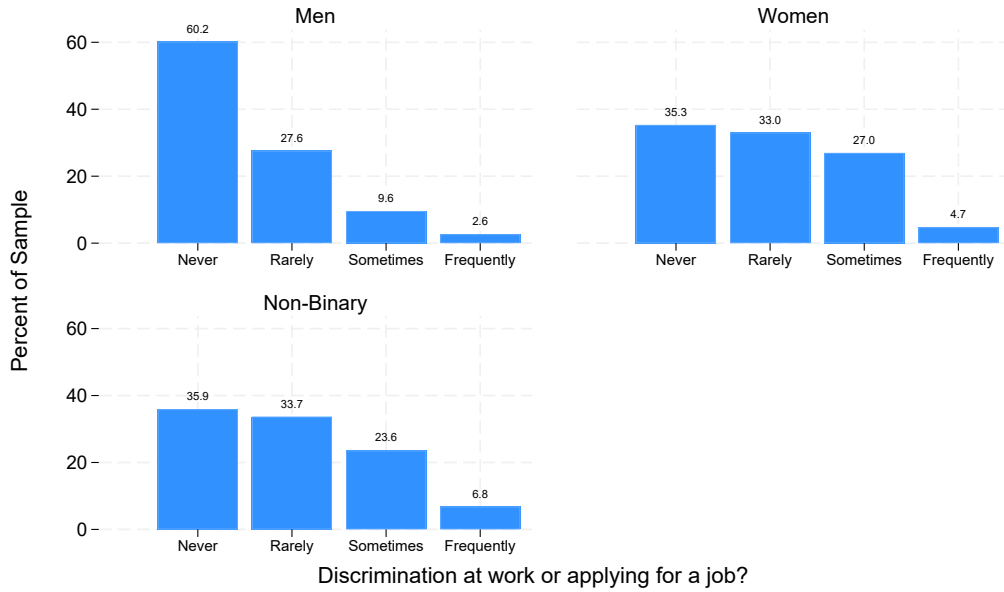
Appendix Figure A6: Discomfort with Non-Binary Close Friend



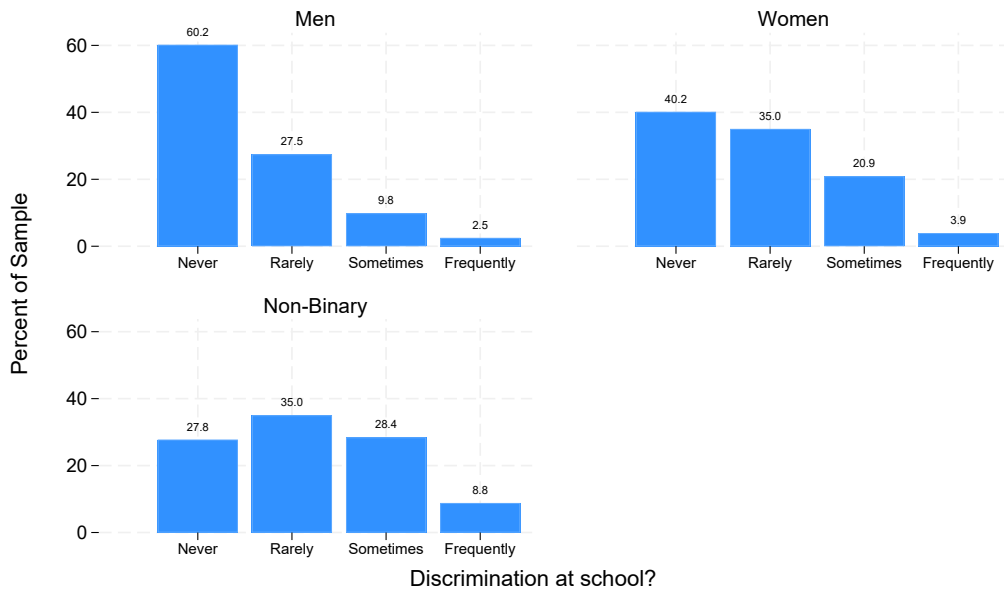
Notes: Sample: Men and Women only. Respondents rated their agreement (0 = Strongly disagree; 10 = Strongly agree) with the statement: “If someone I knew revealed to me that they were non-binary, I would probably no longer be as close to that person.”

Appendix Figure A7: Experienced Discrimination By Context: Work and School

(A) Experienced Discrimination at Work



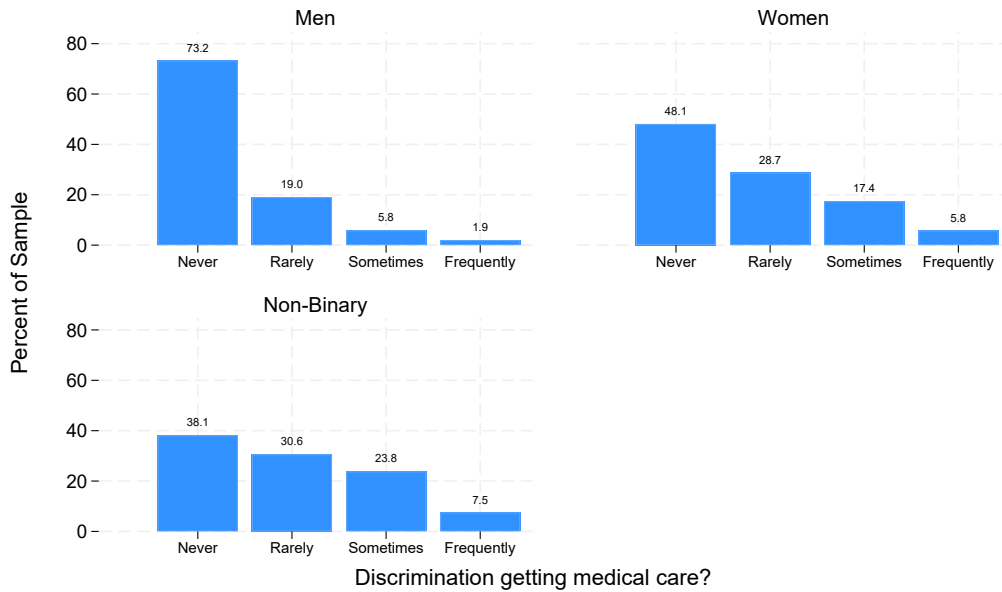
(B) Experienced Discrimination at School



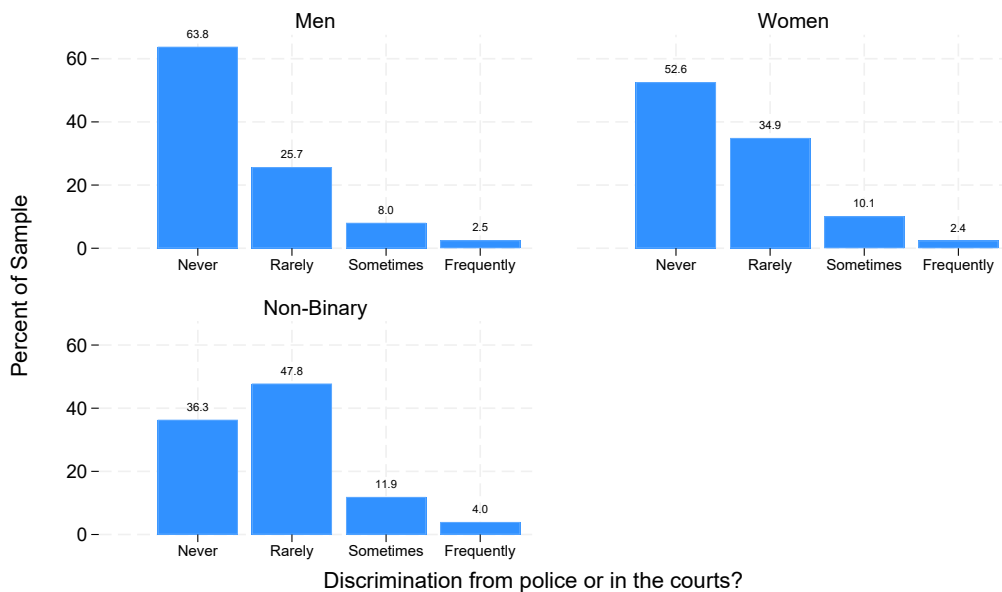
Notes: Respondents answered: “Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following situations because of your gender / gender identity?”

Appendix Figure A8: Experienced Discrimination By Context: Medical and Legal

(A) Experienced Discrimination Getting Medical Care



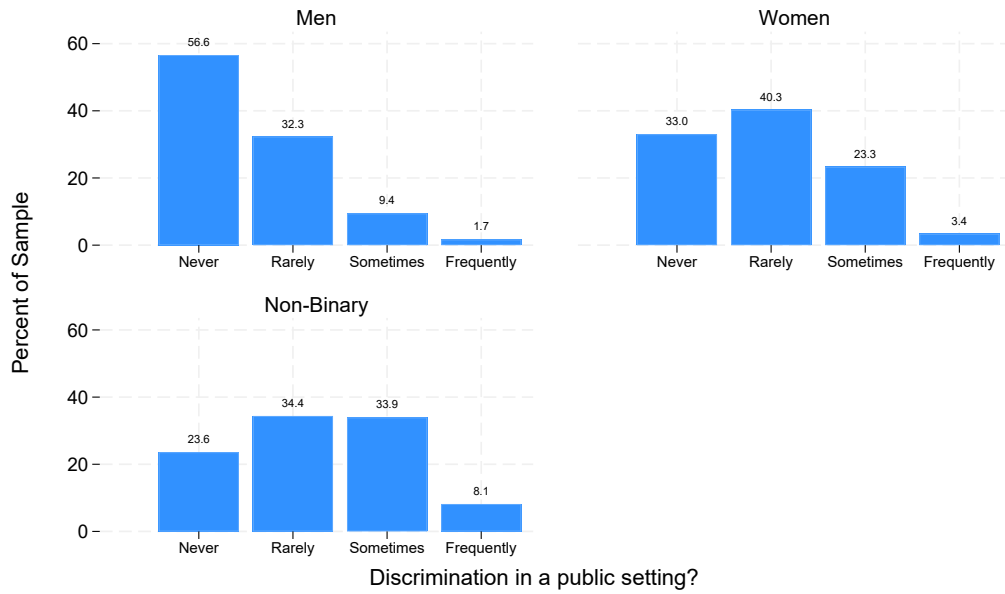
(B) Experienced Discrimination with Police or Courts



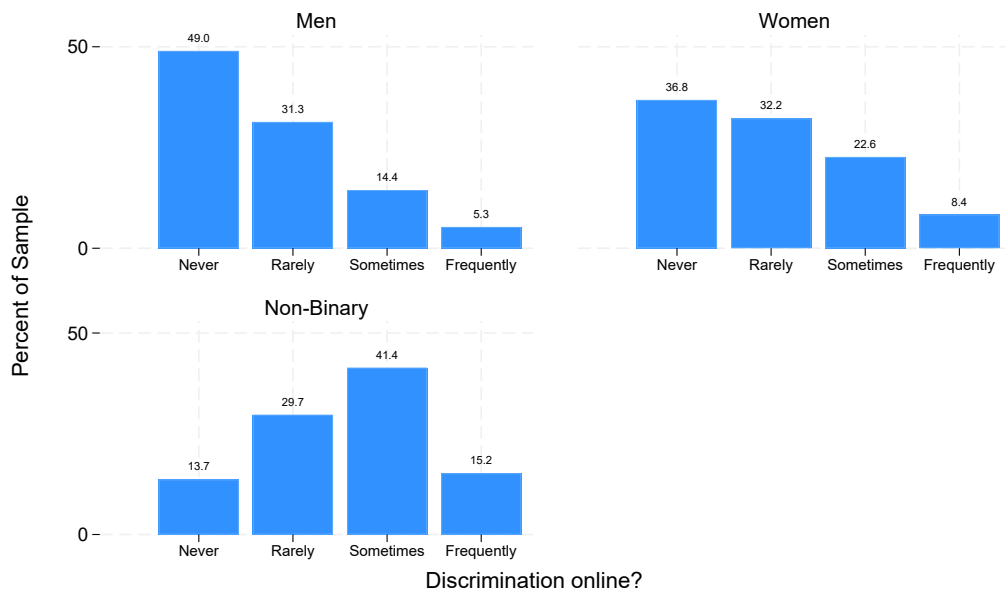
Notes: Respondents answered: “Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following situations because of your gender / gender identity?”

Appendix Figure A9: Experienced Discrimination By Context: Public and Online

(A) Experienced Discrimination In a Public Setting



(B) Experienced Discrimination Online



Notes: Respondents answered: “Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following situations because of your gender / gender identity?”